MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE.

VOL. XXVII. JUNE, 1899. No. 6

INTRODUCTION.

The MONTHLY WEATHER REVIEW for June, 1899, is based on reports from about 3,000 stations furnished by paid and voluntary observers, classified as follows: regular stations of the Weather Bureau, 154; West Indian service stations, 10; cotton region stations, 127; corn and wheat region stations, 133; special river stations, 132; special rainfall stations, 48; voluntary observers of the Weather Bureau, 2,220; Army post hospital reports, 27; United States Life-Saving Service, 14; Southern Pacific Railway Company, 96; Canadian Meteorological Service, 32; Mexican Telegraphic Service, 20; Mexican voluntary stations, 7. International simultaneous observations are received from a few stations and used, together with trustworthy newspaper extracts and special reports.

Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Mr. Curtis J. Lyons, Meteorologist to the Hawaiian Government Survey, Honolulu; the Director of the Central Meteorological and Magnetic Observatory of Mexico; Señor A. M. Chaves, Director-General of Mexican Telegraphs; Mr. Maxwell Hall, Government Meteorologist, Kingston, Jamaica; Capt. S. I. Kimball, Superintendent of the United States Life-Saving Service; and Capt. J. E. Craig, Hydrographer, United States Navy.

The REVIEW is prepared under the general editorial supervision of Prof. Cleveland Abbe.

Attention is called to the fact that the clocks and self-registers at regular Weather Bureau stations are all set to seventy-fifth meridian or eastern standard time, which is exactly five hours behind Greenwich time; as far as practicable, only this standard of time is used in the text of the REVIEW, since all Weather Bureau observations are required to be taken and recorded by it. The standards used by the public in the United States and Canada and by the voluntary observers are believed to conform generally to the modern international system of standard meridians, one hour apart, beginning with Greenwich. Records of miscellaneous phenomena that are reported occasionally in other standards of time by voluntary observers or newspaper correspondents are sometimes corrected to agree with the eastern standard; otherwise, the local meridian is mentioned.

FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

No severe wind storms visited the seaboards or the Great Lakes during June, 1899.

Severe local storms occurred in western Wisconsin the evening of the 12th. The most destructive storm of this group occurred at New Richmond. In the early evening of the 14th a local storm occurred at Herman, Nebr.

During the closing days of June and the early part of July phenominally heavy rains caused destructive floods in the valley of the Brazos River, Tex. These floods, which caused the loss of 40 to 50 lives and destroyed property and crops to the estimated value of about $10,000,000, will be fully discussed in the MONTHLY WEATHER REVIEW for July, 1899.

Timely warnings were issued of high water in the Willamette River at Portland, Oreg., on the last day of the month, and no loss resulted in the flooded district.

Special wheat bulletins for the valley of California were begun June 1. A particular purpose of these bulletins is to give warning to the great wheat growing section of California of the occurrence of northers. During June, 1899, no northers occurred in California.

Rain warnings were issued for the storm which occurred in California May 31–June 1.

Beginning June 1 special fog forecasts have been made at San Francisco, Cal., for the benefit of the shipping interests.

LONG-RANGE FORECASTS.

On June 24 the official in charge of the Weather Bureau office at Milwaukee, Wis., requested a special forecast for Milwaukee and vicinity from the Central Office at Washington on Tuesday, the 27th, to cover the four carnival days ending Friday, June 30. In accordance with this request the following forecast was telegraphed the morning of the 27th:

Observer, Milwaukee, Wis. Conditions favor local rains and thunderstorms Wednesday, and fair weather Thursday and Friday.

In almost exact fulfillment of this prediction local rains the early part of Wednesday were followed during the balance of the carnival period by fair weather.

CHICAGO FORECAST DISTRICT.

There were no severe storms on the upper Lakes during the month of June, 1899.

The afternoon of the 28th a very moderate low pressure area caused high winds on Lake Michigan. The morning advices of that day were that brisk to high northerly winds with showers and squalls were indicated for Lake Michigan that afternoon and night. At Chicago a maximum wind

velocity of 48 miles an hour was registered. Near Chicago a small yacht was capsized and a yachtsman drowned.

A severe local storm occurred in western Wisconsin during the early evening of the 12th, which was most destructive at New Richmond, a town of about 1,500 inhabitants, of whom 114 were reported to have been killed by the fury of the storm, which also wrecked a large number of the most substantial buildings in the main portion of the town. At Herman, Nebr., during the early evening of the 14th, a severe local storm killed several people and demolished several buildings. The forecasts on these occasions were for thunderstorms and showers.—*E. A. Beals, Inspector.*

PORTLAND, OREG., FORECAST DISTRICT.

No storm or frost warnings were issued during the month.

River bulletins were regularly issued, except on Sundays, and on the 30th the river rose and flooded cellars as far back as Fourth street, also some lumber mills along the water front. Owing to timely warnings issued by the Portland office, however, there was no loss of any kind, except such as resulted from inconvenience of moving goods.

Many compliments have been given the Bureau for its river work.—*B. S. Pague, Forecast Official.*

SAN FRANCISCO FORECAST DISTRICT.

Beginning June 1, 1899, a special wheat bulletin was issued daily, except on days when the weekly crop bulletin was printed. This wheat bulletin gave data from the chief points in the great valley of California. This valley is the great wheat growing section of California.

Maximum temperatures exceeding 100° occurred on many days during the month. No northers, however, occurred, and the conditions on the whole were most favorable for the ripening wheat. It is unusual for the month of June to pass without the occurrence of a norther. A sharp outlook was kept that warnings might be given in time, but happily the warnings were not needed.

The storm of May 31 and June 1 was successfully forecast, and rain warnings were issued generally throughout the State of California.

Beginning June 17 a special fog service was inaugurated. The ferry pilots are notified by telephone of the extent and density of the fog in the roadstead outside of the Golden Gate.—*Alexander G. McAdie, Forecast Official.*

AREAS OF HIGH AND LOW PRESSURE.

During the month there were seven highs and six lows sufficiently well defined to be traced upon Charts I and II. The accompanying table gives the principal facts about the origin, disappearance and apparent velocity of these highs and lows, and the following description is added:

Highs.—All the highs of the month were first noted on the Pacific coast except VI (in Minnesota) and VII (in North Dakota). The general motion was toward the east and a little south of east. No. V was last noted in Ohio, and all the rest disappeared in the Atlantic. It should be noted that the observations at St. Johns, Newfoundland, were not available after the 3d, so that for both highs and lows the last appearance in that region could not be located exactly.

Lows.—All the lows except I (off the north Pacific) and II (in Idaho) were first noted to the north of Montana. There was evidently in this region a condition favorable to the development of lows, as can be easily seen by examining Chart II. The general tendency was eastward. All but VI (off the middle Atlantic coast) were last noted in the Gulf of St. Lawrence.

One of the remarkable features of the month was the phenominal fall of 33 inches of rain in ninety hours at Turnersville, Tex., although no low area of any moment was present. The conditions of this rainfall will be described in a special article in this REVIEW.

The following were the highest winds of the month: On the evening of the 1st, as low No. IX, of May, passed over the lower Lake region, Cleveland reported a south wind of 48 miles an hour, in connection with a thunderstorm. On the evening of the 4th Green Bay reported a thunderstorm wind of 40 miles from the southwest. On the evening of the 6th Detroit had a thunderstorm west wind of 40 miles, and Cleveland a similar wind from the north. On the morning of the 10th Norfolk reported a southwest thunderstorm squall of 40 miles, and Cape Henry one from the northwest of 48 miles. On the morning of the 13th, as low No. II was approaching the upper Lakes, Marquette had a southeast wind of 46 miles. As the same low approached New England, evening of the 15th, New York City reported a west wind of 46 miles. On the morning of the 29th, as storm No. VI approached the middle Atlantic coast Nantucket reported a northeast thunderstorm wind of 48 miles, and on the evening of the same day Cape Henry reported a thunderstorm wind from the northwest of 64 miles.

The following were the days of culminating thunderstorms as reported by telegraph from the regular stations of the Weather Bureau: 1st, 23; 2d, 21; 24th, 21; 25th, 21; and 28th, 23.—*H. A. Hazen, Professor.*

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocities.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long W.	Length.	Duration.	Daily.	Hourly.
High areas.		°	°		°	°	*Miles.*	*Days.*	*Miles.*	*Miles.*
I	8, a. m.	36	123	5, p. m.	32	78	4,200	8.5	494	20.6
II	6, p. m	48	129	12, a. m.	41	68	3,210	5 5	584	24.3
III	12, p. m.	47	129	20, a. m.	31	79	3,900	7.5	520	21.7
IV	17, a. m.	46	126	23, p. m.	42	65	3,360	6.5	517	21.5
V	20, p. m.	44	128	24, p. m.	41	82	2,280	4.0	570	23.8
VI	24, p. m.	47	* 94	28, a. m.	33	77	1,680	3.5	480	20.0
VII	27, p. m.	48	102	†2, a. m.	37	73	2,400	4.5	533	22.2
Total							21,030	40.0	3,698	154.1
Mean of 7 paths							3,004		528	22.0
Mean of 30.0 days									526	21.9
Low areas.										
I	*30, p. m.	48	129	16, a m.	49	55	5,160	10.5	491	20.5
II	9. p. m.	54	114	16, p. m.	45	60	3,780	7.0	540	22.5
III	15, p. m.	52	114	19, a. m.	48	65	2,400	3.5	686	28.6
IV	17, p. m.	51	112	22, a m.	47	61	2,640	4.5	587	24.4
V	19, p. m.	51	117	24, p. m.	51	65	2,790	5.0	558	23.3
VI	24, a. m.	44	115	29, a. m.	39	74	3,000	5.0	600	25.0
Total							19,770	35.5	3,462	144.3
Mean of 6 paths							3,295		577	24.0
Mean of 45.5 days									557	23.2

* May. † July.

RIVERS AND FLOODS.

Except in the Columbia and Brazos river basins, the rivers in all sections of the country had a falling tendency, indicating the approach of the usual low-water stages of summer.

General and copious rains over the headwaters of the Mississippi and Missouri rivers during the first half of the month checked the fall and kept the water in the upper portion of those streams at a slightly higher stage than during May.

The effect of this rise on the lower river was hardly perceptible and no danger stages were reported from any of the regular river stations on the Mississippi. On the Missouri, however, a danger stage was attained at Kansas City, where a gage reading of 21.4 feet was recorded on the 11th. In the Red River of the South there was also a slight rise.

The annual spring rise which began in the Columbia River about the middle of May continued throughout June. Forecasts of the probable river stages were issued daily from the Portland, Oreg., Weather Bureau office. The rise, however, was steady and gradual, enabling those receiving the forecasts to take necessary precautions; and, although the danger line was exceeded at several stations, no serious damage resulted.

The flood in the valley of the Brazos River at the close of the month, and during the early days of July, was sudden and destructive, and was the first important flood along that river since 1852, the flood of 1885 being classed as only a moderate one.

As the Brazos Valley flood of June–July, 1899, culminated in the latter month, a discussion of its apparant causes and observed characteristics will be made a feature of the MONTHLY WEATHER REVIEW for July, 1899.

The following preliminary report by I. M. Cline, Official in Charge of the Weather Bureau office at Galveston, Tex., contains, however, much information which is of value and interest in this connection:

The flood in the valley of the Brazos River, commencing June 29 in central Texas and passing out into the Gulf of Mexico between the 12th and 15th of July, 1899, has been, in all respects, the most destructive flood which that section, one of the most productive in Texas, has ever experienced. The Brazos River, with its deep channel, has the capacity for carrying off a vast amount of water, and as a result destructive floods on this river are very rare. According to calculations published in a special bulletin of the Texas Section, Climate and Crop Service, the Brazos River discharges into the Gulf of Mexico, on an average, annually, during the months of April, May, and June, 6,447,403,576 cubic yards of water. In this instance it has been required to carry off more than this amount of water in fifteen days.

Phenomenally heavy rains fell on June 28 and 29 over the drainage basin of the Brazos River in the central portion of the State, and these were followed by heavy rains for four or five days in succession. On June 29 all the tributaries of the Brazos River from McLennan County south to Brazos County were higher than they had ever been before. This water, with that of succeeding rains, caused a flood in the Brazos which inundated all low lands to a depth ranging from 2 to 12 feet. In places it is said that the river was more than 12 miles wide. The flood moved southward very slowly, and it was fourteen days from the time the crest of the flood was noted in central Texas until it passed out into the Gulf of Mexico.

The damage to crops has been very great. All crops on the immediate river bottoms from McLennan County south are a total loss. The land bordering on the Brazos River is the most productive in the State. There was a large acreage in cotton, corn, sugar cane, and other crops. The following are the counties which have suffered the greatest damage: McLennan, Falls, Robertson, Milam, Brazos, Burleson, Grimes, Washington, Waller, Austin, Fort Bend, and Brazoria. There has been a small acreage inundated in some other counties, but no great damage resulted outside of these. Cotton planters have suffered most. The loss of corn has been great, and besides the crop now growing there was a large amount of last year's crop yet in the bins which has been spoiled. Sugar cane plantations in the Brazos bottoms have suffered much. In some places half the crop has been destroyed. The minor crops are also of considerable importance in some of these counties, and the loss of these represents a large sum. Farming implements, stock, and many of the small tenant houses in the bottoms have been washed away. Houses left standing are in many instances not in a fit condition for use. The total losses, judging from press reports and other available information, will aggregate nearly ten million dollars. The number of people who are left without means of sustenance is very large. The towns which have suffered most are Calvert, Brookshire, Richmond, Sandy Point, Columbia, and Brazoria. While the water was well up in some of these towns no great damage resulted except to small settlements in low parts of the surrounding country. There was much suffering during the early part of the flood from hunger and exposure. Notwithstanding rescue parties were organized as rapidly as possible some of the sufferers were in tree tops and on houses for two or three days without food. Life saving crews were organized at Galveston and other points, and sent with boats to aid in the rescue. The Government boats at Galveston were ordered to the assistance of the sufferers. The efficient work of the rescuers prevented many fatalities, and it now appears that the total number of casualties, as a result of the flood, will fall somewhere between forty and fifty.

Action has already been taken by some farmers to plant other crops where cotton and corn have been destroyed. Some cotton will be planted, but to what extent can not be even approximated. Efforts are being made to get the farmers in the flood district to plant a variety of crops. It is desired to make the district self sustaining as soon as possible, and many who have interests along the Brazos River consider this the best course to pursue.

Col. John D. Rodgers of Galveston, who is one of the largest planters along the Brazos River, went to his plantation as soon as he learned of the approaching flood with the intention of looking after his interests personally. Mr. Rogers makes the following statement, which will no doubt be of interest in connection with this report:

"The water around the quarters on my place was from 4 to 4½ feet deep. It was at least 4 to 4½ feet higher than in 1885, and from what information I can get it was at least 2½ to 3 feet higher than in 1852, probably as high if not higher than in 1843. I remember the overflows of 1843 and 1852, but as I was then at different places it is difficult for me to make comparisons. My impression is that it was higher in 1843 than in 1852, and the old citizens in the time of those floods said the rise of 1843 was greater than that of 1833.

"Until the flood of this year we have had but two general overflows, in 1843 and 1852. The flood of 1885 was but partial; it did not overflow more than half of my plantation. The floods in former times have nearly always been in May, giving us plenty of time to replant and make a crop."

The highest and lowest water, mean stage, and monthly range at 128 river stations are given in the accompanying table. Hydrographs for typical points on seven principal rivers are shown on the accompanying chart. The stations selected for charting are: Keokuk, St. Louis, Cairo, Memphis, Vicksburg, and New Orleans on the Mississippi; Cincinnati, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—*F. W. Krichelt, Weather Bureau.*

Heights of rivers referred to zeros of gages, June, 1899.

Stations.	Distance to mouth of river.	Danger line on gage.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Mississippi River.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
St. Paul, Minn	1,957	14	11.0	22,23	5.7	1	9.6	5.3
Reads Landing, Minn	1,887	12	8.9	18	4.9	2	7.2	4.0
La Crosse, Wis	1,822	12	11.8	18	7.1	1-3	9.5	4.7
North McGregor, Iowa	1,762	18	14.4	19-21	7.9	2	11.0	6.5
Dubuque, Iowa	1,702	15	14.8	22-24	8.4	2,9,10	11.2	6.4
Leclaire, Iowa	1,612	10	9.4	24-26	5.4	12,13	7.2	4.0
Davenport, Iowa	1,596	15	11.9	25	7.0	12,13	9.2	4.9
Muscatine, Iowa	1,565	16	13.3	26,27	8.5	13	10.8	4.8
Galland, Iowa	1,475	8	6.7	29	4.1	14	5.4	2.6
Keokuk, Iowa	1,466	14	12.0	29,30	7.7	14,16,17	9.8	4.3
Hannibal, Mo	1,405	17	13.2	30	9.2	18,19	11.2	4.0
Grafton, Ill	1,307	23	16.3	4,5	12.3	21-23	14.1	4.0
St. Louis, Mo	1,264	30	24.8	14	19.8	26	22.4	5.0
Chester, Ill	1,189	36	20.3	15	15.5	27,28	18.2	4.8
Memphis, Tenn	843	33	22.4	1	16.1	30	19.1	6.3
Helena, Ark	767	42	31.6	1,2	23.9	30	27.9	7.7
Arkansas City, Ark	635	42	37.5	1	27.2	30	32.6	10.3
Greenville, Miss	595	42	31.8	1	22.8	30	27.4	9.0
Vicksburg, Miss	474	45	37.1	1	27.4	30	32.2	9.7
New Orleans, La	108	16	13.5	1	10.2	29,30	11.9	3.3
Missouri River.								
Bismarck, N. Dak	1,201	14	11.8	27	7.9	1	9.5	3.9
Pierre, S. Dak	1,006	14	11.5	28	7.5	2	9.7	4.0
Sioux City, Iowa	676	19	14.0	8	10.2	5	12.0	3.8
Omaha, Nebr	561	18	13.7	15,16	11.0	6	12.6	2.7
Plattsmouth, Nebr	533	17	10.5	30	7.9	6	9.3	2.6
St. Joseph, Mo	373	10	10.1	10	7.8	7	8.8	2.3
Kansas City, Mo	280	21	21.4	11	16.6	8	18.7	4.8
Boonville, Mo	191	20	18.3	12	14.2	25	16.0	4.1
Hermann, Mo	95	24	18.3	13	13.5	26	15.8	4.8
Des Moines River.								
Des Moines, Iowa	150	19	9.2	17	4.8	7,8	6.8	4.4
Illinois River.								
Peoria, Ill	135	14	8.5	6-8	4.1	30	6.8	4.4
Beardstown, Ill	70	12	11.8	1,5,6	7.2	30	10.0	4.6
Osage River.								
Bagnell, Mo	70	28	11.8	11	2.3	27,28	5.9	9.5
Gasconade River.								
Arlington, Mo	58	16	—0.2	1	—1.0	23-30	—0.8	0.8
Youghiogheny River.								
Confluence, Pa	59	10	4.0	16	1.4	29	2.3	2.6
West Newton, Pa	15	23	2.2	3	0.4	25	1.2	1.8
Allegheny River.								
Warren, Pa	177	7	2.5	1	0.4	25-30	0.9	2.1
Oil City, Pa	123	13	2.9	1	0.6	29	1.3	2.3
Parkers Landing, Pa	73	20	4.4	1	1.0	15,23,24	1.8	3.4

Heights of rivers referred to zeros of gages—Continued.

Stations.	Distance to mouth of river.	Danger line on gage.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Monongahela River.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Weston, W. Va	161	18	2.5	2	— 0.8	24-26	0.6	3.3
Fairmont, W. Va	119	25	4.8	15	0.6	9, 10	1.9	4.2
Greensboro, Pa	81	18	10.5	15	7.3	10	8.3	3.2
Lock No. 4, Pa	40	28	11.5	16	6.9	10	8.3	4.6
Conemaugh River.								
Johnstown, Pa	64	7	2.4	29	1.0	28	1.5	1.4
Red Bank Creek.								
Brookville, Pa	35	8	0.9	2	0.4	17, 24	0.6	0.5
Beaver River.								
Ellwood Junction, Pa	10	14	2.7	1	0.6	24	1.3	2.1
Great Kanawha River.								
Charleston, W. Va	61	30	10.0	15	4.9	20	6.9	5.1
New River.								
Hinton, W. Va	95	14	5.0	14	1.9	9-11, 24-26	2.6	3.1
Cheat River.								
Rowlesburg, W. Va	36	14	8.0	16	2.0	1, 6-8, 13	3.9	6.0
Ohio River.								
Pittsburg, Pa	966	22	7.2	16	3.2	6	5.5	4.0
Davis Island Dam, Pa	960	25	7.9	1	3.5	27	5.1	4.4
Wheeling, W. Va	875	36	9.8	1	4.0	28	6.3	5.8
Parkersburg, W. Va	785	36	11.8	2	6.0	30	8.0	5.8
Point Pleasant, W. Va	703	39	14.6	3	5.0	30	8.3	9.6
Catlettsburg, Ky	651	50	17.2	4	7.4	30	10.9	9.8
Portsmouth, Ohio	612	50	17.6	4	8 8	30	11.9	8.8
Cincinnati, Ohio	499	50	18.7	5	11.0	13, 28	13.6	7.7
Louisville, Ky	367	28	7.9	7	5.8	14, 15, 30	6.6	2.1
Evansville, Ind	184	35	13.3	9, 10	8.6	30	10.7	4.7
Paducah, Ky.[1]	47	40	14.9	1	8.5	30	12.1	6.4
Cairo, Ill	1,073	45	27.9	1	21.5	30	25.3	6.4
Muskingum River.								
Zanesville, Ohio	70	20	12.1	2	6.4	19	8.3	5.7
Miami River.								
Dayton, Ohio	60	18	1.7	1	0.9	29, 30	1.3	0.8
Wabash River.								
Mount Carmel, Ill	50	15	6.4	5	2.4	30	4.0	4.0
Licking River.								
Falmouth, Ky	30	25	3.5	16	1.3	2, 7, 8	2.0	2.2
Clinch River.								
Speers Ferry, Va	156	20	5.8	14	0.2	9, 10	2.4	5.6
Clinton, Tenn	46	25	9.5	16	3.4	12	4.8	6.1
Tennessee River.								
Knoxville, Tenn	614	28	3.1	16	0.1	24	0.9	3.0
Kingston, Tenn	534	25	3.7	2	1.4	24, 25	2.6	2.3
Chattanooga, Tenn	430	33	6.6	17	3.0	26	4.4	3.6
Bridgeport, Ala	390	24	4.5	16, 18	1.4	27	2.6	3.1
Florence, Ala	220	16	3.8	20	1.2	30	2.3	2.6
Riverton, Ala	190	25	4.2	18, 20	0.7	29, 30	2.3	3.5
Johnsonville, Tenn	91	21	5.1	21, 22	2.5	30	3.7	2.6
Cumberland River.								
Burnside, Ky	434	50	4.9	3	1.6	25	2.5	3.3
Carthage, Tenn	257	30	4.2	4	1.5	28-30	2.5	2.7
Nashville, Tenn	175	40	5.6	5, 6	2.1	30	3.7	3.5
Arkansas River.								
Wichita, Kans	720	10	6.3	10	1.6	1, 2	3.5	4.7
Webbers Falls, Ind. T	407	23	15.9	14	5.0	28, 30	8.9	10.9
Fort Smith, Ark	345	22	16.3	15	6.3	30	7.0	10.0
Dardanelle, Ark	250	21	16.4	16	5.7	30	10.3	10.7
Little Rock, Ark	170	23	16.9	17	7.0	30	11.5	9.9
White River.								
Newport, Ark	150	26	14.3	3	3.5	30	7.4	11.8
Yazoo River.								
Yazoo City, Miss	80	25	11.6	1	2.1	30	6.6	9.5
Red River.								
Arthur City, Tex	688	27	17.4	19	8.3	8	11.3	9.1
Fulton, Ark	565	28	21.8	2	9.0	30	15.2	12.8
Shreveport, La	449	29	12.5	23	9.7	1, 12	11.2	2.8
Alexandria, La	139	33	11.5	9	8.6	16	9.9	2.9
Ouachita River.								
Camden, Ark	340	39	31.4	3	5.1	28	14.0	26.3
Ouachita River—Con.								
Monroe, La	100	40	22.4	16	8.4	30	19.4	14.0
Atchafalaya Bayou.								
Melville, La	100†	31	30.5	1	26.3	30	28.4	4.2
Susquehanna River.								
Wilkesbarre, Pa	178	14	0.8	30	0.0	1-28	0.0	0.8
Harrisburg, Pa	70	17	2.6	2	1.0	24	1.7	1.6
W. Br. of Susquehanna.								
Williamsport, Pa	33	20	2.4	1.2	0.5	22, 24	1.3	1.9
Juniata River.								
Huntingdon, Pa.[2]	80	24	3.5	3-6	3.0	10-30	3.1	0.5
Potomac River.								
Harpers Ferry, W. Va	170	16	3.6	3	1.7	28-30	2.4	1.9
James River.								
Lynchburg, Va	257	18	1.9	14	0.2	24-26	0.9	1.7
Richmond, Va	110	12	0.9	14, 15, 28	—0.2	23, 25	0.3	1.1
Roanoke River.								
Clarksville, Va	155	12	8.2	14	2.0	26	3.4	6.2
Weldon, N. C	90	40	27.5	14	7.5	9, 10	10.9	20.0
Cape Fear River.								
Fayetteville, N. C	100	38	11.1	14	2.5	26	5.1	8.6
Lumber River.								
Fairbluff, N. C	10	6	4.5	17-19	1.2	30	3.2	3.3
Edisto River.								
Edisto, S. C	75	6	4.6	22, 23	2.8	8, 9	3.3	1.8
Pedee River.								
Cheraw, S. C	145	27	6.9	15	1.0	27	2.8	5.9
Black River.								
Kingstree, S. C	60	12	1.7	1	1.0	20, 21	1.4	0.7
Lynch Creek.								
Effingham, S. C	35	12	4.1	23	2.6	30	3.2	1.5
Santee River.								
St. Stephens, S. C	50	12	5.5	18	1.7	29	3.6	3.8
Congaree River.								
Columbia, S. C	37	15	1.1	14	0.0	25	0.5	1.1
Wateree River.								
Camden, S. C	45	24	8.8	12	4.3	27	5.8	4.5
Waccamaw River.								
Conway, S. C	40	7	4.0	24	1.7	8, 9	2.6	2.3
Savannah River.								
Calhoun Falls, S. C	.....	.....	5.0	13	2.9	7, 24, 25	3.4	2.1
Augusta, Ga	130	32	9.8	14	6.3	26	7.5	3.5
Broad River.								
Carlton, Ga	.....	.....	3.7	13, 26	2.3	23-25	2.6	1.4
Flint River.								
Albany, Ga	80	20	2.4	1, 2	0.3	22-23	1.2	2.1
Chatahoochee River.								
West Point, Ga	239	20	4.1	15	2.5	23	3.1	1.6
Coosa River.								
Rome, Ga	225	30	4.0	14	1.7	23-26	2.2	2.3
Gadsden, Ala	144	18	3.3	15, 16	0.7	24-28	1.5	2.6
Alabama River.								
Montgomery, Ala	265	35	3.8	4	1.2	23-25	2.5	2.6
Selma, Ala	212	35	4.5	1	1.4	24, 25	2 9	3.1
Tombigbee River.								
Columbus, Miss	285	33	—1.3	25	—2.9	23	—2 3	1.6
Demopolis, Ala	155	35	1.2	1	—1.9	2	—0.7	3.1
Black Warrior River.								
Tuscaloosa, Ala	90	38	2.0	1	—0.1	23-25	0.5	2.1
Columbia River.								
Umatilla, Oreg	270	25	25.2	21	17.1	1	21.4	8.1
The Dalles, Oreg	166	40	43.0	22	28.5	1	36.3	14.5
Willamette River.								
Albany, Oreg	99	20	8.0	3	5.0	2, 3	6.6	3.0
Portland, Oreg	10	15	24.2	23	17.1	1	21.1	7.1
Sacramento River.								
Red Bluff, Cal	241	23	4.	1	0.9	29, 30	1.7	3.7
Sacramento, Cal	70	25	17.2	6	12.0	30	14.9	5.2

[1] Record for 30 days. [2] Record for 28 days.

CLIMATE AND CROP SERVICE.

By JAMES BERRY, Chief of Climate and Crop Service Division.

The following extracts relating to the general weather conditions in the several States and Territories are taken from the monthly reports of the respective sections of the Climate and Crop Service. The name of the section director is given after each summary.

Rainfall is expressed in inches.

Alabama.—The mean temperature was 79.8°, or 2.2° above normal; the highest was 105°, at Selma on the 23d, and the lowest, 49°, at Oneonto on the 18th. The average precipitation was 2.54, or 1.87 below normal; the greatest monthly amount, 9.50, occurred at Daphne, and the least, 0.64, at Eufaula.—*F. P. Chaffee.*

Arizona.—The mean temperature was 78.8°, or 1.6° below normal; the highest was 120°, at Aztec and Parker on the 30th, and at Texas Hill on the 17th and 29th, and the lowest, 25°, at Prescott on the 2d. The average precipitation was 0.82, or 0.71 above normal; the greatest amount, 2.52, occurred at Pantano, while none fell at Buckeye and Sentinel—*W. G. Burns.*

Arkansas.—The mean temperature was 77.3°, or 0.1° above normal; the highest was 102°, at Jonesboro on the 5th, and the lowest, 50°, at Witts Springs on the 18th. The average precipitation was 2.74, or 1.22 below normal; the greatest monthly amount, 5.90, occurred at Pond, and the least, 0.20, at Luna Landing.—*E. B. Richards.*

California.—The mean temperature for the State, obtained by weighting the reports from 290 stations, so that equal areas have about the same weight, was 71.5°, or 0.5° above the June normal for the State, as determined from 201 records; the highest was 122°, at Volcano Springs, on the 13th, and the lowest, 23°, at Bodie on the 26th. The average precipitation for the State, as determined by the records of 300 stations, was 0.57; the excess, as indicated by reports from 167 stations which have normals, was 0.30; the greatest monthly amount was 4.05,

at Delta, Shasta County, while none fell at 44 stations.—*Alexander G. McAdie.*

Colorado.—The mean temperature was 62.1°, or 1.0° below normal; the highest was 106°, at Lamar on the 18th and 19th, and Holyoke on the 19th, and the lowest, 18°, at Troutvale on the 1st. The average precipitation was 1.26, or practically normal; the greatest monthly amount, 3.48, occurred at Fox, and the least, 0.07, at Fort Morgan.—*F. H. Brandenburg.*

Florida.—The mean temperature was 80.4°, or about normal; the highest was 104°, at McClenny on the 16th, and the lowest, 53°, at McClenny on the 18th. The average precipitation was 5.43, or 1.57 below normal; the greatest monthly amount, 11.57, occurred at Plant City, and the least, 0.63, at Merritt's Island.—*A. J. Mitchell.*

Georgia.—The mean temperature was 80.2°, or 2.2° above normal; the highest was 106°, at Leverett, on the 8th and the lowest, 49°, at Jesup on the 19th. The average precipitation was 2.59, or 2.50 below normal; the greatest monthly amount, 7.84, occurred at Blakely, and the least, 0.55, at Putnam.—*J. B. Marbury.*

Idaho.—The mean temperature was 58.4°, or 1.5° below normal; the highest was 103°, at Hagerman and Oakley on the 18th and 17th, respectively, and the lowest, 17°, at Paris on the 8th. The average precipitation was 0.73, or 0.29 below normal; the greatest monthly amount, 1.76, occurred at Murray, and the least, trace, at Chesterfield and Downey.—*S. M. Blandford.*

Illinois.—The mean temperature was 73.3°, or about 0.8° above normal; the highest was 100°, at Ottawa on the 19th, and the lowest, 37°, at Chemung on the 16th. The average precipitation was 2.75, or about 1.09 below normal; the greatest monthly amount, 6.55 occurred at Albion, and the least, 0.86, at Glenwood.—*C. E. Linney.*

Indiana.—The mean temperature was 73.5°, or 1.4° above normal; the highest was 99°, at Vincennes on the 5th and 6th, and the lowest, 38°, at Winamac on the 16th and Delphi on the 17th. The average precipitation was 2.86, or 0.75 below normal; the greatest monthly amount, 7.65, occurred at Vevay, and the least, 0.60, at La Port.—*C. F. R. Wappenhans.*

Iowa.—The mean temperature was 70.7°, or about 0.7° above normal; the highest was 100°, at Clarinda and Stuart on the 18th, and the lowest, 42°, at Decoreh, Maquoketa, West Branch, and Ruthven on the 16th, 17th, 12th, and 15th, respectively. The average precipitation was 5.04, or 0.78 above normal; the greatest monthly amount, 11.99, occurred at Logan, and the least, 1.10, at Lockridge.—*J. R. Sage, Director; G. M. Chappel, Assistant.*

Kansas.—The mean temperature was 73.9°, or 0.1° below normal; the highest was 110°, at Viroqua and Wallace on the 19th, and the lowest, 40°, at Colby on the 6th. The average precipitation was 5.53, or 1.24 above normal; the greatest monthly amount, 11.17, occurred at Dodge, and the least, 0.58, at Viroqua.—*T. B. Jennings.*

Kentucky.—The mean temperature was 76.1°, or 1.0° above normal; the highest was 100°, at Bowling Green on the 27th and Paducah on the 5th, and the lowest, 44°, at Loretto and Marrowbone on the 14th. The average precipitation was 2.80, or 1.38 below normal; the greatest monthly amount, 5.54, occurred at Maysville, and the least, 0.14, at Canton.—*H. B. Hersey.*

Louisiana.—The mean temperature was 79.8°, or 0.3° below normal; the highest was 102°, at Liberty Hill on the 3d, and the lowest, 50°, at Cheneyville and Mansfield on the 18th. The average precipitation was 5.76, or 0.51 below normal; the greatest monthly amount, 13.33, occurred at Sugar Experiment Station, and the least, 1.13, at Shreveport.—*W. T. Blythe.*

Maryland and Delaware.—The mean temperature was 73.7°, or 1.9° above normal; the highest was 102°, at Boettcherville on the 23d, and the lowest, 36°, at Deerpark on the 17th. The average precipitation was 2.69, or 0.42 below normal; the greatest monthly amount, 6.24, occurred at Deer Park, and the least, 1.05, at Coleman.—*O. L. Fassig.*

Michigan.—The mean temperature was 65.9°, or 0.7° above normal; the highest was 98°, at Port Austin on the 4th and Coldwater on the 7th, and the lowest, 22°, at Newberry on the 28th. The average precipitation was 2.99, or 0.33 below normal; the greatest monthly amount, 6.80, occurred at Calumet, and the least, 0.82, at Ionia.—*C. F. Schneider.*

Minnesota.—The mean temperature was 65.4°, or about 1.0° below normal; the highest was 95°, at Milaca on the 19th, and the lowest, 34°, at Mount Iron on the 8th. The average precipitation was 6.36, or about 2.00 above normal; the greatest monthly amount, 14.35, occurred at Minnesota City, and the least, 2.27, at Bermidji.—*T. S. Outram.*

Mississippi.—The mean temperature was 79.6°, or 0.6° below normal; the highest was 104°, at Brookhaven and Okolona on the 7th and 23d, respectively, and the lowest, 52°, at Lake, Louisville, Pearlington, and Pontotoc on the 19th, 18th, 23d, and 18th, respectively. The average precipitation was 3.86, or 1.13 below normal; the greatest monthly amount, 9.20, occurred at Biloxi, and the least, 0.75, at Palo Alto.—*H. E. Wilkinson.*

Missouri.—The mean temperature was 73.4°; the highest was 101°, at Gayoso on the 21st, and the lowest, 42°, at Potosi on the 17th. The average precipitation was 3.98, or about 1.00 below normal; the greatest monthly amount, 9.05, occurred at Mount Vernon, and the least, 1.53, at Houston.—*G. J. O' Connor.*

Montana.—The mean temperature was 57.8°, or 1.8° below normal; the highest was 96°, at Billings and Glendive on the 26th and 28th, respectively, and the lowest, 26°, at Adel and Fort Yellowstone on the 8th and 6th, respectively. The average precipitation was 1.77, or 0.74 below normal; the greatest monthly amount, 7.37, occurred at Wibaux, and the least, trace, at Billings and Fort Yellowstone.—*E. J. Glass.*

Nebraska.—The mean temperature was 70.0°, or about 0.4° above normal; the highest was 108°, at Baker City on the 18th, and the lowest, 28°, at Kennedy on the 23d. The average precipitation was 3.83, or 0.07 below normal; the greatest monthly amount, 11.76, occurred at Tekamah, and the least, 0.80, at Seneca.—*G. A. Loveland.*

Nevada.—The mean temperature was 63.5°, or 2.5° above normal; the highest was 102°, at Silver Peak on the 19th and 23d, and the lowest, 24°, at Elko on the 6th. The average precipitation was 0.61, or about 0.18 above normal; the greatest monthly amount, 2.62, occurred at Palisade, while none fell at several stations.—*J. H. Smith.*

New England.—The mean temperature was 66.4°, or 1.5° above normal; the highest was 99°, at Bridgeport, Conn., on the 7th, and the lowest, 30°, at Grafton, N. H., on the 11th. The average precipitation was 2.88, or normal; the greatest monthly amount, 7.37, occurred at Jefferson, Mass., and the least, 1.04, at Portland, Me., and Concord, N. H.—*J. W. Smith.*

New Jersey.—The mean temperature was 72.3°, or 2.7° above normal; the highest was 103°, at Toms River on the 6th, and the lowest, 38°, at Charlotteburg on the 11th. The average precipitation was 2.50, or 0.88 below normal; the greatest monthly amount, 4.34, occurred at Englewood, and the least, 1.03, at Cape May City.—*E. W. McGann.*

New Mexico.—The mean temperature was 69.2°, or 1.1° below normal; the highest was 102°, at Gallinas Spring on the 20th, and Springer on the 11th, and the lowest, 17°, at Winsors on the 4th. The average precipitation was 1.03, or 0.06 below normal; the greatest monthly amount, 3.29, occurred at Winsors, while none fell at Gage.—*R. M. Hardinge.*

New York.—The mean temperature was 67.5°, or 1.2° above normal; the highest was 98°, at Cedar Hill on the 5th, Poughkeepsie, Brentwood, and Primrose on the 6th, Westpoint on the 7th, and Mount Morris on the 14th, and the lowest, 30°, at Oneonto on the 11th. The average precipitation was 2.39, or 1.32 below normal; the greatest monthly amount, 6.73, occurred at Carmel, and the least, trace, at Lyndonville.—*R. G. Allen.*

North Carolina.—The mean temperature was 75.8°, or 0.5° above normal; the highest was 103°, at Tarboro on the 8th, and the lowest, 39°, at Linnville on the 19th. The average precipitation was 4.07, or 0.29 below normal; the greatest monthly amount, 8.16, occurred at Highlands, and the least, 0.84, at Settle.—*C. F. von Herrmann.*

North Dakota.—The mean temperature was 62.4°, or 2.2° below normal; the highest was 96°, at Woodbridge and Fort Yates on the 29th, and the lowest, 30°, at Glen Ullin on the 1st. The average precipitation was 4.02, or 0.18 above normal; the greatest monthly amount, 9.02, occurred at Towner, and the least, 1.40, at New England City.—*B. H. Bronson.*

Ohio.—The mean temperature was 71.5°, or 1.2° above normal; the highest was 102°, at Seaman on the 22d, and the lowest, 36°, at Orangeville on the 17th. The average precipitation was 2.96, or 0.56 below normal; the greatest monthly amount, 7.68, occurred at Pataskala, and the least, 1.02, at Willoughby.—*J. Warren Smith.*

Oklahoma.—The mean temperature was 73.7°, or 2.7° below normal; the highest was 106°, at Beaver on the 19th, and the lowest, 52°, at Tahlequah on the 18th. The average precipitation was 5.06, or 1.93 above normal; the greatest monthly amount, 8.26, occurred at Hopeton, and the least, 2.19, at Healdton.—*J. I. Widmeyer.*

Oregon.—The mean temperature was 58.1°, or 1.3° below normal; the highest was 98°, at Beulah on the 15th, and the lowest, 17°, at Silver Lake on the 5th. The average precipitation was 0.99, or 0.50 below normal; the greatest monthly amount, 3.51, occurred at Bay City, while none fell at P. Ranch.—*B. S. Pague.*

Pennsylvania.—The mean temperature was 69.9°, or 1.5° above normal; the highest was 101°, at Wilkesbarre on the 6th, and the lowest, 32°, at Dushore, on the 11th. The average precipitation was 3.51, or 0.28 below normal; the greatest monthly amount, 5.97, occurred at Chambersburg, and the least, 0.65, at White Haven.—*T. F. Townsend.*

South Carolina.—The mean temperature was 79.4°, or 1.9° above normal; the highest was 105°, at Greenwood on the 9th and the lowest, 48°, at Shaws Fork on the 17th. The average precipitation was 3.89, or 0.73 below normal; the greatest monthly amount, 8.55, occurred at Blackville, and the least, 1.38 at Santuck.—*J. W. Bauer.*

South Dakota.—The mean temperature was 66.4°, or about 1.0° below normal; the highest was 108°, at Cherry Creek (P. O. Leslie) on the 29th, and the lowest, 25°, at Rochford on the 7th. The average precipitation was 3.69, or about 0.09 below normal; the greatest monthly amount, 7.86, occurred at Centerville, and the least, 0.96, at Hot Springs.—*S. W. Glenn.*

Tennessee.—The mean temperature, 76.6°, was about 2.0° above normal; the highest was 102°, at Madison on the 23d, and the lowest, 36°,

at Erasmus on the 18th. The average precipitation was 2.71, or about 1.50 below normal; the greatest monthly amount, 6.14, occurred at Springdale, and the least, 0.12, at Madison.—*H. C. Bate.*

Texas.—The temperature on an average for the month, determined by comparison of 42 stations distributed throughout the State, was 1.1° below the normal; there was a slight excess in a few localities over the northeastern portion, while there was a general deficiency ranging from 1.0° to 3.1° in all other sections, with the greatest over southwest Texas. The highest was 106°, at Sugarland on the 24th, and the lowest, 49°, at Amarillo on the 9th. The precipitation on an average for the month, determined by comparison of 47 stations distributed throughout the State, was 3.88 above the normal. About normal conditions prevailed along the immediate east and west coast districts and over the extreme west portion of the State, while there was a general excess elsewhere, ranging from 1.00 to 19.06, with the greatest in the vicinity of Fort Clark; the greatest monthly amount, 22.32, occurred at Fort Clark, and the least, 0.61, at El Paso.—*I. M. Cline.*

Utah.—The mean temperature was 64.0°, or 1.6° below normal; the highest was 110°, at Saint George on the 30th, and the lowest, 21°, at Snowville on the 25th and Woodruff on the 6th. The average precipitation was 0.59, or 0.17 above normal; the greatest monthly amount, 2.43, occurred at Tooele, while none fell at Kelton and Snowville—*L. H. Murdoch.*

Virginia.—The mean temperature was 74.0°, or about 1.0° above normal; the highest was 106°, at Doswell on the 7th, and the lowest, 40° at Burkes Garden on the 18th. The average precipitation was 3.71 or 0.02 above normal; the greatest monthly amount, 7.60, occurred at Hot Springs, and the least, 1.11, at Manassas.—*E. A. Evans.*

Washington.—The mean temperature was 58.0°, or about 1.5° below normal; the highest was 97°, at Kennewick on the 17th, and the lowest, 31°, at Monte Cristo on the 5th. The average precipitation was 1.41, or 0.50 below normal; the greatest monthly amount, 5.81, occurred at Cedar Lake, and the least, 0.01, at Moxee.—*G. N. Salisbury.*

West Virginia.—The mean temperature was 72.0°, or 0.9° above normal; the highest was 98°, at Eastbank on the 5th, New Cumberland, Upper Track, and Weston on the 24th, and the lowest, 35°, at Terra Alta on the 14th and 18th. The average precipitation was 4.99 or 0.91 above normal; the greatest monthly amount, 8.93, occurred at Oceana, and the least, 1.46, at Huntington.—*C. M. Strong.*

Wisconsin.—The mean temperature was 66.1°, or 0.2 below normal; the highest was 94°, at Prairie du Chien on the 20th, and Delavan on the 6th. The average precipitation was 5.54, or 1.35 above normal; the greatest monthly amount, 11.56, occurred at La Crosse, and the least, 1.60, at North Crandon.—*W. M. Wilson.*

Wyoming.—The mean temperature was 58.0°, or 1.5° below normal; the highest was 103°, at Bitter Creek on the 17th and Carbon on the 30th, and the lowest, 14°, at Rock Springs on the 7th. The average precipitation was 1.82 or slightly above normal; the greatest monthly amount, 5.50, occurred at Rock Springs, and the least, 0.18, at Evanston.—*W. S. Palmer.*

SPECIAL CONTRIBUTIONS.

RECENT PAPERS BEARING ON METEOROLOGY.

W. F. R. PHILLIPS, in charge of Library, etc.

The subjoined list of titles has been selected from the contents of the periodicals and serials recently received in the library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau:

American Journal of Science. New Haven. Vol. 8. *4th series.*
McLean, G. V. Velocity of Electric Waves in Air. P. 1.

Boletin Agricola y Meteorológico. Barcelona. Año 1.
Lozano, E. Marcha media anual de la temperatura en Barcelona. P. 102.

Bulletin Mensuel de l'Observatoire Carlier d'Orthez. 5me Année.
Leon, Henri. Orages dans les Pyrénées. P. 13.
Marchand. Origine solaire des orages. P. 14.
Piche, A. De la prévision du temps à courte échéance à l'aide du baromètre dans le département des Basses-Pyrénées. P. 17.

Ciel et Terre. Bruxelles. 20me année.
V. Ventosa. Direction du vent et la scintillation. P. 197.
Russell, Cte. H. Nuages et Montagnes. P. 210.
Spring, W. Remarques sur une note de M. Pernter, concernant la couleur bleue du ciel. P. 177.

Comptes Rendus. Paris. Tome 128.
Palladine, W. Modification de la respiration des végétaux à la suite des alternances de température. P. 1410.
Gutton, C. Comparaison des vitesses de propagation des ondes électromagnétiques dans l'air et le long des fils. P. 1508.

Geographical Journal. London. Vol. 14.
Murray, (Sir) J. Temperature of the Floor of the Ocean, and of the Surface Waters of the Ocean. P. 34.

Nature. London. Vol. 60.
Review of A. J. Henry. Wave or billow clouds. P. 235.

La Nature, Paris, 27 année.
Jullien, O. Uncyclone. P. 42.

Meteorologische Zeitschrift. Wien. Band 16.
Koch, K. R. Ein Normalbarometer. P. 193.
Hann, J. Einige Ergebnisse der meteorologischen Beobachtungen am Observatorium Vallot auf dem Mont Blanc. P. 198.
Billwiller, R. Ueber verschiedene entstehungsarten und Erscheinungsformen des Föhns. P. 204.
Hann, J. Die ungeheuren Regemengen am Fusse des Kamerun-Pik. P. 215.
Beyerlein, Fr. Einige Versuche über den Wasserverlust bei Regenmessungen durch Verdunstung und durch Befeuchtung des Regenmessers. P. 217.
Rona. Die Gewitter in Ungarn. P. 219.
Prohaska, K. Gewitter und Hagelschlag am 9 August, 1898, in den Ostalpen. Wetterschiessen. P. 224.
Prohaska, K. Gewitter in November 1898 in den Ostalpen. P. 226.
Penck, A. Ein mysteriöses Phänomen der Geophysik. P. 227.
Reimann. Die geometrischer Verhältnisse des Nordlichts vom 9 September, 1898, um 9.45 p. m. P. 230.
Wolfer, A. Wirbelsturm zu St. Vincent. P. 232.

L. E. D. Philosophical Magazine. London. Vol. 48.
Waidner, C. W., and Mallory, F. Comparison of Rowland's Mercury Thermometers with a Callendar-Griffiths Platinum Thermometer; Platinum Thermometer with a Tonnelot Thermometer Standardized by the Bureau International; Reduction of Rowland's Value of Mechanical Equivalent of Heat to Paris, Nitrogen Scale. P. 1.
Milner, S. R., and Chattock, A. P. Thermal Conductivity of Water. P. 46.
Knott, C. G. Reflexion and Refraction of Elastic Waves, with Seismological Applications. P. 64.
Maclean, G. V. Velocity of Electric Waves in air. P. 115.
Fisher, O. Residual Effect of Former Glacial Epoch upon Underground Temperature. P. 134.
Rayleigh, *Lord*. Theory of Anomalous Dispersion. P. 151.
Chree, C. Denudation and Deposition. P. 156.

Quarterly Journal of the Royal Meteorological Society. Vol. 25.
Bayard, F. Campbell. Government Meteorological Organizations in Various Parts of the World. P. 69.
Mawley, Edward. Report on the Phenological Observations for 1898. P. 133.
Davis, William Morris. Circulation of the Atmosphere. P. 160.

Scottish Geographical Magazine. Vol. 15.
(Review of T. H. Engelbrecht). Zones of Cultivation. P. 365.

Symons Meteorological Magazine. London. Vol. 34.
Clayton, H. H. Recent Recurrence in Weather; Lunar or 30-day Period. P. 68.
Jones, J. H. Black Rain. P. 73.

Das Wetter. 16 *Jahrgang.*
Less, Dr. Emil. Die wissenschaftlichen Grundlagen von Wetterprognosen für kurze und solchen für etwas längere Zeiträume. P. 121.
Meissner, Friedrich. Barometer und Niederschlag. P. 129.
Nippoldt, Jun., A. Cirrus und sein Werth für Prognosen auf den nächsten Tag nach A. Stanhope Eyre P. 137.

Zeitschrift für Instrumentenkunde. Berlin. 19 *Jahrg.*
Sprung, A. Ueber den photogrammetrischen Wolkenautomaten und seine Justirung. (Fortsetzung P. 118. P. 131.

Zeitschrift für Luftschiffahrt. Berlin. 18 *Jahr.*
Hinterstoisser. Einige Daten über die simultanen Ballonfahrten am 24 März, 1899, in Wien. P. 104.

Deutsche Mechaniker Zeitung. Beiblatt zur Zeitschrift für Instrumentenkunde. 1899.
Scheel, Karl. Temperatur und Druckmessung. P. 81, 89.

EXTRAORDINARY RAINFALL IN TEXAS.

By H. A. HAZEN, Professor, Weather Bureau (dated August 1, 1899).

During the last four days of June, 1899, the heaviest rainfall in the records of Texas occurred near the headwaters of the Brazos River and caused the disastrous floods in that valley. Turnersville, about 240 miles from the Gulf, had over 33 inches of rain in ninety hours, and Hearne, some 80 miles toward the southeast, reported over 30 inches. Probably an area of nearly 2,000 square miles experienced a rain of about 30 inches in less than four days. During the last twelve Junes rains of over 10 inches a month have occurred at 19 stations, or less than two a month. In June, 1899, 12 stations reported over 10 inches in only four days. The remarkable fact is that these rains occurred so far from the Gulf. Point Isabel, on the Gulf coast, reports no rain at all in these four days. Of the 100 stations reporting more than 10 inches in any one month in the past twelve years, over 80 per cent have been located more than 50 miles from the Gulf. It should be noted that the data studied are not strictly comparable, because in 1888 the number of stations reporting rainfall in Texas was very much less than at present. The heaviest of the rains in the present June occurred on land gradually rising from 500 to 2,000 feet, and this is probably an important factor in their formation. The heaviest rainfall in the world, sometimes over 200 inches in a single month, occurs at Cherapunjee, on the Khasia hills in India, and where the land slopes up to 4,000 feet above sea level.

An examination of the weather maps shows the remarkable fact that there was no serious disturbance of the atmosphere in Texas at the time of these rains. On the morning of the 27th there was a slight storm area between Galveston and Corpus Christi, but the only rain was 2.02 inches, at Galveston. The same evening Galveston had 0.68 inch, but this was practically all at this station during the four days. On the evening of the 27th all the winds on the Gulf coast were from the southeast, showing that the slight storm had advanced entirely upon the land. The wind at Palestine, the nearest regular station, throughout the heavy rains was from the northeast, and steady at about 8 miles an hour. The pressure rose steadily at Palestine from 29.86 inches, the lowest, on June 26 at 8 p. m. The total rainfall at Palestine was 7.42 inches.

If we allow for the full effect of topography and for the impinging of north winds from an advancing high pressure area upon the south and southeast winds of the slight storm, we must still acknowledge their entire inadequacy to account for such heavy downpours as these. We must admit the great lack of facts on which to base a complete explanation. It is probable that the phenomena were analogous to those attending the so-called cloud-bursts, about the cause of which almost nothing is known.

OBSERVATIONS AT RIVAS, NICARAGUA.

The records contributed for many years by Dr. Earl Flint, at Rivas, Nicaragua, include barometric readings. His present station is at 11° 26′ N., 85° 47′ W. The observations at 7:17 a. m., local time, are simultaneous with Greenwich 1 p. m. The altitude of his barometer is 36 meters above sea level, but until the barometer has been compared with a standard it seems hardly necessary to publish the daily readings. The wind force is recorded on the Beaufort scale, 0–12. When cloudiness is less than $\frac{1}{10}$, the letter "F," or "Few," is recorded.

This station is situated on the western shore of Lake Nicaragua, not far from the eastern end of the western division of the Nicaragua Canal. The volcano Ometepe, on an island in Lake Nicaragua, is about 10 miles northeast of the station. Mr. Flint's records occasionally mention the presence of clouds on the summit of this mountain.

Dr. Flint's reports to the Weather Bureau now embrace two distinct features, namely, the simultaneous morning observations and the daily climatological summary, as given in the two following tables for each month.

Simultaneous observations at 1 p. m. Greenwich (or 7:17 a. m. local) time, June, 1899.

Date.	Temperature.		Wind.		Upper clouds.			Lower Clouds.		
	Air.	Dew-point.	Direction.	Force.	Kind.	Amount.	Direction from.	Kind.	Amount.	Direction from.
	°	°								
1	79	72	ne.	6	.....	.....	.....	k.	10	ne.
2	79	71	ne.	4	cs.	10	sw.	.....	.....	.....
3	79	72	ne.	3	cs.	5	sw.	k.	1	ne.
4	80	75	ne.	3	cs., ks.	10	sw.	k.	Few	ne.
5	80	76	ne.	0	ck.	6	sw.	ak.	2	ne.
6	78	73	n.	0	.....	.....	.....	ak.	8	n.
								k.	1	ne.
7	78.5	74	ne.	4	.....	.....	.....	k.	10	ne.
8	77	74	ne.	0	ck.	8	sw.	k.	2	ne.
9	76.5	73	nw.	0	.....	.....	.....	kn.	10	nw.
10	75.5	72	ne.	0	.....	.....	.....	kn.	10	ne.
11	77	74	ne.	0	.....	.....	.....	kn.	10	ne.
12	78	74	ne.	3	.....	.....	.....	k.	10	ne.
13	79	73	ne.	5	ck.	10	sw.	.....	.....	.....
14	80	74	ne.	3	.....	.....	.....	f. k.	9	ne.
15	80	73	ne.	5	.....	.....	.....	f. k.	4	ne.
16	79.5	72	ne.	3	.....	.....	.....	f. k.	3	ne.
17	79.5	72	ne.	4	.....	.....	.....	ak., sk.	6	ne.
18	79	75	ne.	3	.....	.....	.....	k.	7	ne.
19	80	74	ne.	5	.....	.....	.....	as., k.	10	ne.
20	76.5	73	ne.	1	.....	.....	.....	ak., k.	9	ne.
21	79	76	ne.	3	.....	.....	.....	k.	6	ne.
22	79.5	75	ne.	3	.....	.....	.....	k.	10	ne.
23	80.5	73	ne.	5	ck.	9	sw.	k.	1	ne.
24	80.5	72	ne.	5	ck.	10	sw.	.....	.....	.....
25	80	73	ne.	3	.....	.....	.....	f. k.	5	ne.
26	80	73	ne.	6	.....	.....	.....	ak.	2	ne.
27	80	74	ne.	4	.....	.....	.....	k.	10	ne.
28	81	74	ne.	6	.....	.....	.....	ak.	1	.....
								k.	2	ne.
29	80	76	ne.	3	.....	.....	.....	k.	10	ne.
30	78.5	71	ne.	4	ck.	2	sw.	ak., k.	1	ne.
Means	79.0	.....	.....	.....	.....	.....	.....	.....	.....	.....

Climatological observations for twenty-four hours ending at 7:17 a. m. local (or 1 p. m. Greenwich) time, June, 1899.

Date.	Temperature.		Wind.		Average cloudiness.	Total rainfall.
	Maximum.	Minimum.	Prevailing direction.	Maximum force.		
	°	°				*Inches.*
1	88	74	ne.	5	5	0.00
2	90.4	78	ne.	6	3	0.00
3	87	76	ne.	5	9	0.00
4	90.4	78	ne.	5	3	0.00
5	89	76.5	ne.	4	5	0.06
6	89.2	78	ne.	3	5	0.99
7	87	76.5	ne.	5	8	0.00
8	84	77	ne.	5	10	1.15
9	84	76	se.	4	9	0.62
10	85	75	sw.	3	7	2.76
11	82	74.5	ne.	4	10	0.00
12	84.2	75	ne.	3	7	0.45
13	82	76	ne.	6	9	0.13
14	87	76.2	ne.	5	8	T.
15	86	78	ne.	5	7	0.00
16	88	78.5	ne.	5	3	0.00
17	87.5	78	ne.	6	4	0.00
18	88	78	ne.	7	6	0.33
19	84	78.2	ne.	4	9	0.31
20	82	76	ne.	5	10	0.35
21	84.4	75	ne.	4	3	0.00
22	87.2	76	ne.	3	5	0.00
23	89.5	77	ne.	6	5	0.00
24	89	78	ne.	6	7	0.00
25	87	78	ne.	5	8	0.32
26	88	79	ne.	4	2	0.00
27	87	78	ne.	6	3	0.00
28	87	79	ne.	5	8	0.06
29	87	79	ne.	6	9	0.00
30	84	78	ne.	5	8	0.16
Sums	.....	.....	.....	.....	.....	7.69
Means	86.5	77.0	.....	.....	.....	.....

OBSERVATIONS AT HONOLULU.

Through the kind cooperation of Mr. Curtis J. Lyons, Meteorologist to the Government Survey, the monthly report of meteorological conditions at Honolulu is now made nearly in accordance with the new form, No. 1040, and the arrangement of the columns, therefore, differs from those previously published.

Meteorological observations at Honolulu, June, 1899.

The station is at 21° 18′ N., 157° 50′ W.
Pressure is corrected for temperature and reduced to sea level, and the gravity correction, —0.06, has been applied.
The average direction and force of the wind and the average cloudiness for the whole day are given unless they have varied more than usual, in which case the extremes are given. The scale of wind force is 0 to 12, or Beaufort scale. Two directions of wind, or values of wind force or amounts of cloudiness, connected by a dash, indicate change from one to the other.
The rainfall for twenty-four hours has always been measured at 7:30 p. m., not 1 p. m., Greenwich time, on the respective dates.
The rain gauge, 8 inches in diameter, is 1 foot above ground. Thermometer, 9 feet above ground. Ground is 43 feet, and the barometer 50 feet above sea level.

Date.	Pressure at sea level.	Temperature.		During twenty-four hours preceding 1 p. m., Greenwich time, or 2:30 a. m., Honolulu time.									Total rainfall at 9 a. m., local time.
				Temperature.		Means.		Wind.		Average cloudiness.	Sea-level pressures.		
		Dry bulb.	Wet bulb.	Maximum.	Minimum.	Dew-point.	Relative humidity.	Prevailing direction.	Force.		Maximum.	Minimum.	
	*	†	†			‡	‡		§				
1	30.02	71	67	81	72	62.5	64	ene.,nne	5-3	3	30.11	30.01	0.04
2	30.00	73	67.5	81	71	64.7	73	ne.	4-2	4	30.08	29.98	0.03
3	30.03	72	65.5	82	70	64.5	68	ne.	3	3	30.06	29.99	0.00
4	30.01	73	67	82	72	64.3	66	ne.	3-4	3-6	30.08	30.01	0.00
5	30.00	73	67.5	84	72	64.0	65	ne.	3	3-6	30.08	29.99	0.01
6	30.00	73	67	84	73	63.7	64	ene.	3-1	6-2-7	30.03	29.98	0.00
7	29.99	68	66.5	82	70	63.5	64	nne.	3-0	2-8	30.04	29.94	0.01
8	30.01	73	65	82	68	63.0	71	ne.	3-0	3-8	30.05	29.97	0.00
9	30.03	72	66	82	72	61.0	60	ne.	4	4	30.07	30.02	0.04
01	30.00	71	66	82	70	62.5	64	nne.	4	3	30.08	30.00	0.05
11	30.00	71	66	81	70	63.0	68	ne.	4	3	30.04	29.96	0.06
12	30.01	72	65.5	82	69	63.0	63	ne.	4	3-1	30.04	29.97	0.04
13	30.00	71	66.5	81	70	63.7	68	ne.	4	3-7	30.05	29.99	0.05
14	30.03	71	64.5	83	69	63.0	67	nne.	3	3	30.08	30.00	0.00
15	30.04	72	65	84	71	60.3	60	nne.	2	2-4	30.08	30.00	0.00
16	30.04	73	64	82	70	61.5	63	ne.	3	3	30.07	30.01	0.00
17	30.00	72	66	81	72	60.7	60	ne-nne.	3-5	5	30.07	29.99	0.03
18	30.01	72	66.5	81	69	62.7	65	ne.	4	2-4	30.05	30.00	0.04
19	30.04	71	66	84	70	63.3	65	ne.	3	4	30.07	30.02	0.11
20	30.03	72	65.5	82	69	62.5	65	nne.	4	4	30.09	30.01	0.02
21	29.98	72	64.5	82	70	62.0	63	ne-nne.	3	1	30.09	29.98	0.00
22	29.99	70	67	83	72	62.0	63	ne.	3-5	2-6	30.05	29.98	0.20
23	30.00	74	66.5	82	69	64.3	71	ne.	3-5	8-3	30.03	29.98	0.11
24	30.02	74	66	82	72	62.7	63	ene.	5	3-8	30.06	29.98	0.09
25	30.01	72	68	83	70	63.3	64	ne.	4	4	30.07	29.99	0.03
26	29.98	72	68	83	72	66.5	73	ne.	3	3-8	30.06	29.98	0.11
27	29.96	73	66.5	81	70	66.0	72	ene.	3	4	30.01	29.93	0.01
28	29.95	73	65.5	83	71	63.0	63	ne.	3	1	30.01	29.94	0.00
29	29.97	73	67.5	83	73	61.5	60	ne.	3	3	30.03	29.97	0.02
30	29.95	70	65.5	83	70	64.5	67	ne.	3	2	30.02	29.94	0.04
Sums.													1.14
Means.	30.003	72.0	66.3	82.3	70.6	63.1	65.4			3-8	30.058	29.983	
Departure.	+0.008					—2.2	—5.0			—0.2			—0.40

Mean temperature for June, 1899 (6+2+9)÷3=75.3°; normal is 76.1°. Mean pressure for June (9+3)÷2 is 30.021; normal is 30.013.
*This pressure is as recorded at 1 p. m., Greenwich time. †These temperatures are observed at 6 a. m., local, or 4:30 p. m., Greenwich time. ‡These values are the means of (6+9+2+9)÷4. §Beaufort scale.

SOME PHYSICAL FEATURES AND FLOOD CONDITIONS OF THE JAMES RIVER VALLEY.[1]

By EDWARD A. EVANS, Section Director, Richmond, Va.

The sources of the James River have their rise in the elevated valleys of the central Appalachian range, about 1,800 feet above sea level. Descending rapidly and flowing in a generally easterly direction, the stream crosses the valley of Virginia through Botetourt County and forces its passage through the Blue Ridge at Balcony Falls, in the extreme southeast corner of Rockbridge County, at an elevation of about 700 feet above sea level, or about twice the elevation of the Potomac River at the point where it breaks through the same barrier.

Entering the Piedmont district, it continues its easterly direction until it reaches the middle counties proper, when it swings abruptly to the northeast, which course it pursues until near the thirty-eighth parallel of latitude, when it again resumes its generally eastward trend, entering tidewater at the foot of the falls at Richmond.

Its main tributaries are the Jackson, Cowpasture, Craig, and North rivers in the Appalachian and valley division, the Pedlar, Tye, and Rockfish rivers in the Piedmont division, and the Slate, Willis, and Rivanna rivers in the middle division. There are also several large tributaries flowing in below Richmond, but they are not material for the purpose of this article, which is intended simply to set forth briefly some facts concerning the area and soil conditions of the James basin, and the movement of flood waves from its headwaters to the head of tidewater at Richmond, or what may be considered as the flood district.

It is interesting to note, as showing the physical characteristics of this great watershed, that nearly all of the rivers entering the James come in from the north, where the slope from the crest of the basin to the river level is gradual, and the area large. On the south side it is mostly abrupt and contracted, draining, as a rule, a narrow strip of land contiguous to the main stream. A striking illustration of this feature may be found in Campbell County, where the Falling River, which rises only some 5 miles from the James, flows southward into the Roanoke.[2]

A portion of the country immediately adjacent to the south bank of the James is, therefore, the northern limit of the watershed of all the Virginia rivers which pass out of the State into North Carolina.

The counties and parts of counties comprising that portion of the James basin which is under consideration, are twenty in number, extending from the Alleghanies to the extreme eastern portion of the middle division, inclusive, a majority of which lie on the north side of the river. Their area, roughly, is about 4,390,000 acres.

A brief description of their topography and soil characteristics may be admissible here, as germane to the subject to the extent that a steep land gradient and a hard, compacted, or loose, porous condition of the soil, affords some indication of the probable amount of water which will reach the draining stream under various conditions of precipitation.

In the Appalachian counties are found all the surroundings favorable to rapid drainage. The face of the country is rugged and mountainous, with steep descents from mountain top to valley. The soil is loose and porous; shallow, except in the valleys, and rests upon the solid rock, and hence all moisture in excess of that required to wet it may be expected to quickly reach its outlet. The dip of the basin is mostly eastward.

In the valley counties of the basin, the contour of the land becomes generally undulating, with occasional spurs or headlands of the Alleghenies and Blue Ridge projecting into it. The fall of the land is generally east and south over the northern basin, and east and north in the southern basin. The prevailing soil is a clay loam of great natural fertility. It lacks the looseness and porosity of the Appalachian soils, and sheds a larger percentage of moisture, especially during

[1] The following is a selection of paragraphs from a paper under the above title, published in the Annual Summary for 1898 of the Virginia Section of the Climate and Crop Service. The general treatment of the subject by Mr. Evans seems to the Editor to offer an excellent model for similar work on other river basins. We have omitted only the large hydrographs of the James River for the year 1898 at Richmond and Lynchburg. The elevations of the zeros of the gages are, respectively, 2.8 and 499 feet above mean sea level. The danger lines are, respectively, 12 and 18 feet above the zeros. Therefore, that portion of the river below Richmond is essentially an arm of the sea.—ED.

[2] Since this article first appeared I have been informed by Mr. Murrell, voluntary observer, at Coleman's Falls, Bedford County, that on his farm the divide approaches to within a mile or a mile and a half of the river. The upheaved rock takes a course parallel with the river for a distance of 50 miles or more.—E. A. E.

periods of heavy precipitation and over lands dipping steeply to the stream bed. The influence of the sharp, sudden thunderstorms of summer is immediately apparent in the neighboring streams, the surface, like all clays, shedding water freely when it becomes wet.

This region is subject to heavy thunderstorms and also large monthly amounts of precipitation during spring and fall, and in considering its outflow as aiding to produce freshet water in the James, it is important not to lose sight of these facts.

Primarily, of course, the amount of precipitation deposited must be the main point as a basis for calculation. But previous or attendant circumstances, or features, should also receive their proper share of attention, as, for example: prior condition of the soil in respect to dryness or moisture, its ability to absorb or shed moisture, depth to subsoil, character of subsoil, and *rate* of precipitation. These Appalachian and valley counties may be called the upper drainage basin of the James.

Proceeding to the watershed of the Piedmont and middle counties, we find the land rolling and very hilly, particularly on the lower slopes of the Blue Ridge, and falling gradually eastward to the tidewater division. The crest of the Blue Ridge is, geologically, the oldest land in the State, being the first to appear above the waters, and in its higher valleys originate most of the various streams which unite to drain this portion of the basin. In the Piedmont and parts of the middle counties basin is found a soil commonly known as "the red lands." Generally, the soil is fertile, and the exposed decomposing rock, in many localities, furnishes fertilizing ingredients, such as soda and lime, which, carried into the streams by washing rains, is deposited in the "bottom" lands, making them exceptionally rich and productive.

In 1607, Captain John Smith, speaking of tidewater Virginia, said: "The vesture of the earth in most places doth manifestly prove the soyle to be lusty and very rich." Had he applied this observation to these bottom lands, it would have been equally appropriate.

The area comprised in this portion of the James watershed is larger than that of either the valley or Appalachian, and, owing to the rolling character of the country, an excess of moisture does not require much time to reach an outlet. The soil is mostly lighter and more porous than that of the valley basin.

The main feeder of the James is the Rivanna River, which drains a region of large annual precipitation; it is subject to sudden rises to freshet height, which, entering the James at Columbia, make high water at Richmond generally within twelve hours.

This is usually a late spring, summer, or early fall condition, when thunderstorms are prevalent, and rises from this source, both large and small, may be easily traced on the hydrograph. A combination, with rises, coming down from the upper watershed, will produce the highest gage reading recorded at the Richmond station.

It constitutes a source of immediate and pressing danger to the business interests of Richmond, whenever sufficient precipitation occurs over its basin to cause 15 or more feet at Columbia, while for 19 feet flood warnings are issued.

Among the many features of interest connected with high water in the James, may be mentioned one which has an important bearing in estimating flood heights on the lower courses of the stream, viz, the flattening of the crest. From careful examination of the gage records at Lynchburg and Richmond, it is found that rises resulting from precipitation over the upper watershed (Appalachian and valley basins) will diminish in height from 1 to 2 feet on stages of 5 feet or less, and from 2 to 3 feet on stages between 5 and 12 feet. For the middle watershed (Piedmont and middle counties basin) flood water coming out of the Rivanna River shows, in a still more marked degree, this crest flattening. No daily gage readings for Columbia are available, so that the difference on moderate stages can not be determined; but for flood stages sufficient data are at hand to accurately estimate it. Comparison of Columbia stages of 19 feet, or more, with Richmond readings of the same flood wave, show a diminution in the vertical height of from 9 to 12 feet. But the Columbia gage readings are, in a sense, abnormal, and strictly local, and by no means indicate the general height of the river. The Rivanna here enters the James at nearly right angles, and at a point where the latter river is narrow, and it results, therefore, that freshet water coming from this source is banked up against the south shore of the James, producing a congested condition, during which it attains a local height greatly in excess of that at points either above or below, before it is carried away. Therefore, much of the flattening of flood crests between Columbia and Richmond may be ascribed to this cause.

In what are generally known as "Rivanna freshets," from 50 to 60 per cent of the height at Columbia will reach Richmond. Combined with flood water from the upper basin, the percentage increases from 60 to sometimes as high as 70.

The rate of flood travel is another highly important consideration. It varies with the amount of precipitation and watershed over which it is deposited. For that portion of the river above, or west of, Lynchburg, the information available is too meager to enable a satisfactory result to be arrived at, but from Lynchburg east to Richmond, the Weather Bureau readings will serve to show the time required for flood travel between the two points.

The river chart for 1898, represents, practically, an average year of water fluctuation and travel. It differs little in extremes or midstages from other years, not exceptional, and may therefore be used to determine the daily march, or progress, of a curve of high water. Summarizing the various rises shown thereon, it is found that upper river water will require from two to three days to pass from Lynchburg to tidewater, the difference in time depending on the volume carried; if accelerated by an influx from the Rivanna and other middle basin feeders, one and a half days are required.

Rivanna basin water, from Columbia to Richmond, moves down in from twelve to eighteen hours, the latter time being for moderate stages.

In the foregoing, the term "upper watershed" has been considered as applying to the Appalachian and valley counties drainage area, and "upper waters" as that portion of the stream contained in this watershed, while the middle watershed refers to the basin lying between the Blue Ridge and head of tide. Rivanna water belongs to this district, but is used distinctively on account of its preponderating influence in producing floods.

RECORDS BY THE KITE CORPS AT BAYONNE, N. J.

By H. L. ALLEN, Bayonne, N. J. (dated July 28, 1899).

The following table, showing the results of thermometer observations at Bayonne, is in continuation of that published on page 11 of the MONTHLY WEATHER REVIEW for January, and is communicated by Mr. Henry L. Allen, on behalf of his colleagues of the Bayonne kite corps. The star in the fifth column indicates those cases in which piano wire was used. As nothing is said to the contrary, it is to be assumed that the temperatures at or just below the kite are as recorded by a Six thermometer and that the maximum temperatures, therefore, in general, refer to some layer of air near the ground, while the minimum temperatures refer to the highest altitude attained. The records for New York City refer to the Weather Bureau station, whose thermometer is 313 feet above the ground and 350 feet above sea level, and have been supplied by the Records Division from the self-registers kept at the New York station.

Thermometer ascensions made at Bergen Point, Bayonne, N. J., by the Bayonne kite corps.

Number.	Ascension. Date.	Ascension. P. M. Began.	Ascension. P. M. Ended.	Kite record. Altitude.	Kite record. Temperature. Max.	Kite record. Temperature. Min.	Local conditions. Temperature. Beginning.	Local conditions. Temperature. Ending.	Local conditions. Wind.	Local conditions. Sky.	New York. Temperature. Beginning.	New York. Temperature. Ending.	New York. Winds during ascensions. Direction.	New York. Winds during ascensions. Velocity.	Average daily temperature observed by Mr. Eadie, at Bayonne, N. J. Same day.	Second day.	Third day.
1	2	3 H. M.	4 H. M.	5 Feet.	6 °	7 °	8 °	9 °	10	11	12 °	13 °	14	15 Miles.	16 °	17 °	18 °
61	February 7, 1899.....	8 40	9 40	400	23	22	23	22	nne.	Cloudy.	28	28	ne.	20	24.5	25.5	11
62	February 11, 1899....	9 50	10 10	200	12	8	12	12	nw.	Cloudy and snowing.	8	8	nw.	12	6	8	9
63	February 13, 1899....	3 00	3 30	100	10	6	10	10	nnw.	Cloudy; snowstorm.	4	4	ne.	38	9	17.5	16
64	February 22, 1899 ...	2 10	3 45	942*	56	49	56	56	sw.	Partly cloudy.	47	49	w.	9	43.5	40	33.5
65	February 27, 1899....	9 15	10 15	.....	36	31	34	31	w.	Clear; moonlight.	40	40	nw.	26	42.5	36	40
66	March 25, 1899	8 15	9 35	753	32	30	32	32	se.	Cloudy; snowing.	31	31	se.	20	34	39	36.5
67	April 17, 1899.....	7 20	7 45	300	52	48	51	50	wsw.	Clear.	59	58	n.	19	49.5	50.5	52.5
68	April 22, 1899.....	4 35	5 22	400	57	52	56	53	s.	Clear.	55	52	se.	13	48.5	59.5	57.5
69	April 22, 1899.....	9 05	9 17	300*	45	43	44	44	sw.	Clear.	48	47	s.	10	48.5	59.5	57.5
70	April 22, 1899.....	9 35	10 45	525*	48	43	44	43	sw.	Clear.	47	46	sw.	10	48.5	59.5	57.5
71	April 25, 1899.....	8 12	9 50	750*	66	61	64	61	ssw.	Partly cloudy.	64	63	sw.	18	58	68.5	59.5
72	April 29, 1899.....	5 21	9 02	600*	66	58	66	58	sw.	Clear.	58	56	se.	14	57	65	72
73	April 29, 1899.....	9 32	10 00	300*	56	54	56	56	sw.	Clear.	56	56	s.	12	57	65	72
74	May 6, 1899.....	5 32	5 55	250	62	60	61	61	ssw.	Partly cloudy.	58	59	se.	8	59	64	59
75	May 6, 1899.....	8 27	10 26	2,100*	61	56	60	59	ssw.	Cloudy.	61	59	sw.	13	59	64	59
76	May 20, 1899.....	9 42	10 45	500*	54	50	54	50	nw.	Partly cloudy.	54	53	nw.	24	55.5	58	58.5
77	May 30, 1899.....	10 17†	12 03	715*	79	70	78	82	w.	Partly cloudy.	72	76	w.	12	70	74.5	76.5
78	May 30, 1899.....	3 50	5 30	1,667*	85	73	84	80	wsw.	Partly cloudy.	79	79	nw.	20	70	74.5	76.5
	May 30, 1899.....	...	.....	500*	84	77	84	80	wsw.	Partly cloudy.	.....	.....	.....	.....	70	74.5	76.5
79	June 3, 1899.....	8 37	10 45	1,605*	70	66	70	66	sw.	P. cloudy to clear.	71	68	s.	7	74.5	71.5	79
80	June 8, 1899.....	8 42	9 37	400	82	76	82	76	w.	Clear.	82	81	n.	14	78.5	75	68.5
81	June 12, 1899.....	9 32	10 17	410*	68	66	67	66	sw.	Clear.	67	66	se.	11	68	71.5	80.5
82	June 19, 1899.....	8 47	9 30	481	75	72	75	70	wsw.	Partly cloudy.	75	75	sw.	7	73	80.5	75
83	June 23, 1899.....	8 50	9 26	400	72	66	72	69	sw.	Partly cloudy.	66	66	s.	12	68	79.5	74
84	June 24, 1899.....	4 05	4 53	568*	92	80	92	84	sw.	Partly cloudy.	82	79	se.	8	79.5	74	75
85	June 24, 1899.....	8 55	9 34	325	72	68	72	69	ne.	Cloudy and shower.	72	71	ne.	12	79.5	74	75
86	June 27, 1899.....	8 21	9 02	600*	72	70	70	70	ssw.	Partly cloudy.	72	71	s.	20	73	73	71
87	June 29, 1899.....	8 20	9 35	1,480*	70	65	70	64	nw.	Clear.	71	69	nw.	21	71	69	68.5
88	July 1, 1899.....	8 50	9 18	600*	68	66	68	66	s.	Clear.	.....	.....	.....	.....	68.5	75	79.5
89	July 4, 1899.....	11 05†	12 00‡	400*	91	84	91	91	s. to sw.	Partly cloudy.	.....	.....	.....	.....	78.5	78	78
90	July 4, 1899.	1 55	5 00	2,400*	90	80	90	88	se. to s.	Partly cloudy.	.....	.....	.....	.....	78.5	78	78

*Piano wire used. †A. M. ‡Meridian.

MEXICAN CLIMATOLOGICAL DATA.

Through the kind cooperation of the Central Meteorologico-Magnetic Observatory, the monthly summaries of Mexican data are now communicated in manuscript, in advance of their publication in the *Boletín Mensual*. An abstract, translated into English measures, is here given, in continuation of the similar tables published in the MONTHLY WEATHER REVIEW since 1896. The barometric means have not been reduced to standard gravity, but this correction will be given at some future date when the pressures are published on our Chart IV.

Mexican data for June, 1899.

Stations.	Altitude.	Mean barometer.	Temperature. Max.	Temperature. Min.	Temperature. Mean.	Relative humidity.	Precipitation.	Prevailing direction. Wind.	Prevailing direction. Cloud.
	Feet.	*Inch.*	° *F.*	° *F.*	° *F.*	%	*Inch.*		
Aguascallientes.....	6,106	23.87	84.6	50.9	71.4	58	7.43	se.	ese., s.
Colima.....	1,600	28.27	95.7	64.8	77.2	80	15.23	wsw.	ene.,sw.
Culiacán Rosales (E. d. S.)	112	29.70	98.6	63.5	83.8	55	.....	sw.	ne.
Durango (Seminario).	6,243	24.04	89.6	51.8	72.3	52	2.13	sw.	e.
Leon (Guanajuato)...	5,984	24.29	89.1	53.4	68.7	63	4.31	s.	ne.
Mexico (Obs. Cent.)..	7,472	23.04	79.7	52.0	62.4	67	4.15	n.	ne.
Morelia (Seminario)..	6,401	23.97	78.3	55.4	54 9	78	7.22	s., se	ne.
Oaxaca	5,164	25.02	94.6	53.6	68.7	78	10.10	nw.	ne.
Puebla (Col. Cat.)....	7,112	23.35	81.9	50.9	65 5	82	9.90	ene , e.	n.
Saltillo(Col. S. Juan).	5,399	25 01	95.2	56.8	71.1	70	6.50	n.	sw.
Tuxpan.....	19	30.14	104.9	66.2	82.0	78	9.49	e.	w.
Zapotlan (Seminario)	5,078	25.09	88.9	57.2	69.4	69	9.60	sse.	e.

THE PRECIPITATION OVER THE PACIFIC NORTHWEST AND THE POSSIBILITY OF HIGH WATER IN THE COLUMBIA FROM THE MELTING SNOW IN THE MOUNTAINS.

By B. S. PAGUE, Forecast Official.

The Columbia River, with its tributaries, drains that portion of the United States west of the one hundred and eleventh meridian and north of latitude 42°, except a portion of northwestern Washington and southwestern Oregon. The greater portion of the eastern half of British Columbia is also drained by the tributaries of the Columbia. The total area drained is approximately 350,000 square miles, or about 250,000,000 acres; an area nearly equal to one-half of that portion of the United States east of the Mississippi. The main tributaries of the Columbia are the Snake, Clark's Fork, Kootenai, Okanogan, Yakima, John Day, Deschutes, and Willamette. The Snake drains southern and eastern Idaho. It has two principal tributaries, the Clearwater, and the Salmon, the latter being much the larger. Western Montana, and northern Idaho are drained by the Kootenai and Clark's Fork. Eastern British Columbia is drained by lakes and streams all finally running into the Columbia. The Okanogon drains the northern portion of central Washington; the Yakima in Washington and the Deschutes in Oregon drain the eastern slope of the Cascades, and the John Day drains the southern slope of the Blue Mountains in northeastern Oregon. The Willamette drains the northwestern portion of Oregon between the Coast and Cascade mountains, north of the Calapooia Mountains. There are many other streams which are important tributaries to the Columbia, but for the purpose of this paper it is not necessary to mention them.

The country drained by the Columbia is, for the most part, mountainous, or high plateau. There are many valleys, all having elevations of over 1,000 feet, and the greater number having 2,000 feet and upward. The plateau country ranges in elevation from 1,800 to 5,000 feet. The mountains range in elevation from 2,500 to 12,000 feet. The line of perpetual snow, in the region under discussion, ranges from 6,000 to 8,000 feet. As few of the mountains have any considerable area above the snow line, it is seen that the winter's snowfall is almost entirely melted each year and the water carried off by the Columbia.

For the six months, from May 1 of each year, the total precipitation averages about six inches over the country drained by the Columbia, hence it is seen the rainfall occurring after the snow begins to melt is too small in amount to be considered in this discussion.

The precipitation over the country drained by the Columbia from October to April amounts to from 8 to 16 inches, and is principally in the form of snow; it settles and packs

on the mountains and in the canyons and is always sufficient to produce a flood, if rapid melting occurs over the entire country. Should the melting occur at intervals or be gradual, as is usually the case, then high water occurs, but not a flood. A flood will not occur if the country drained by the Snake loses its snow before the snow melts from the upper Columbia country, but should the snow melt over both sections at the same time, as in 1894, a flood is inevitable. The greatest amount of snow is usually found in the mountains of northeastern Oregon and northern Idaho. An examination of the physical condition prevailing over the Pacific northwest will make it clear why this is so. A very large amount of snow is found in eastern British Columbia and the northern portion of central Washington; in the other sections the snowfall is of much less amount, hence it is not so important for the purpose of this paper.

In 1893–94, the greatest excess of precipitation occurred in January, December, and March. In 1898–99, there was no month with any marked excess of precipitation occurring in the entire district under discussion. Considering that a deficiency of precipitation occurred at all places named, and such was the case in 1898–99, it is reasonable to assume, and it is assumed, that a similar deficiency occurred over the surrounding mountain region; if this be true, then there was not the amount of snowfall in the mountains during the past winter that there was in the winter of 1893–94. Floods in the Columbia do not depend so much upon the total precipitation of winter, as upon the amounts of snow in the mountains when the thawing in April begins. It is well known that the influence of chinook winds removes great quantities of snow from the foot hills and lower mountains during the winter season, and an absence of chinooks or even normal temperatures will allow much of the snow that falls during the winter to remain unmelted until spring. Such snow packs, hardens, and becomes a greater mass, for each new fall of snow adds to that already fallen and remains unmelted. These facts being established, the temperature conditions during the winter then become as important as the precipitation.

[Here follow statements giving the departure from the normal temperature, at various places for the winters of 1893–94 and 1898–99.—ED.]

A summary of the these shows that the various places were colder in 1898–99 than in 1893–94, as follows: Spokane, 3.7°; Walla Walla, 12.4°; Idaho Falls, 3°, and Helena, 19.5°. At Baker City, owing to the warmth of January, 1899, the past winter has been 2.7° warmer than the winter of 1893–94. This warmth was purely local at Baker City, and can have no material influence on the subject as a whole.

The winter of 1893–94 had, on an average, over the country drained by the Columbia and tributary rivers, 10.22 inches of precipitation, and in 1898–99 it had 7.34 inches; or the former had 2.88 inches more precipitation than the latter. While this is true as regards the precipitation, the temperature record shows that the last winter averaged 5.2° colder than the winter of 1893–94. Considering the absence of the usual number of chinook winds during the last winter, and the almost continuous deficiency in temperature, the consequent increased accumulation of snow, for up to April 1, there has been practically no melting, it is reasonable, therefore, to assume that there is, on April 1, 1899, as much or possibly more snow in the mountains than there was on April 1, 1894. This deduction from the actual records is proven by the reports from over 200 persons, living at the present time, nearest to the snow line.

Assuming, then, that there is as much snow in the mountains on April 1, 1899, as on the same date five years ago, it is apparent that the Columbia will have to carry to the ocean the same number of gallons of water during the next three months that it carried in 1894.

The amount of snow now in the mountains is sufficient to produce a flood, if May has a period of warm weather. If there are alternate warm and cool periods there is less possibility of a flood. If the warm weather covers Idaho and Oregon before it reaches Washington, British Columbia, and Montana, the water will not be as high in the river as it will be should the warm weather invest the entire Pacific northwest at the same time.

It can safely be assumed that the river at Portland will rise to from 20 to 25 feet, and at Umatilla about 2 feet more; at The Dalles the height will be from 37 to 45 feet. These heights will probably occur during the month of June; higher water in the river will prevail if temperatures much above the normal prevail during the latter part of May and the fore part of June.

NOTES BY THE EDITOR.

CLIMATOLOGICAL DATA FOR CANADA.

The Annual Reports for the Meteorological Service of Canada for the years 1895 and 1896 have been published in quarto volumes, the previous reports for many years past having been confined to octavo. The new style gives room for the publication of much more climatological data than previously, and doubtless in future years the quantity will be still further increased. The Canadian stations are classified as *first-class* when all observations are made three times a day; *second-class*, when temperature, wind, weather, and rain are observed three times a day; *third-class*, when only precipitation and the general state of the weather are recorded. *First order* (international program), when self-registering instruments are maintained for pressure, temperature, evaporation, and wind, as the Magnetic Observatory at Toronto; *chief stations*, when all ordinary observations are taken at regular intervals not exceeding four hours; *telegraph reporting stations*, when the observations are taken three times a day—at 8 a. m., 3 p. m., and 8 p. m., seventy-fifth meridian time.

There are one first order, about thirty telegraph stations, about two hundred ordinary stations of the first, second, and third class, and eight chief stations whose records are given in the Report for 1895. The first part of the Report gives the monthly and annual summaries from telegraph and ordinary stations of the first class; sixty-four such stations are given on as many pages. Part II gives similar summaries for stations of the second class; in all about one hundred and sixty-three stations are given on eighty pages. Part III contains the monthly and annual mean temperatures and total precipitations for all stations; the mean temperatures are, when possible, computed by the formula $1/4\,(7+2+2\times 9)$, otherwise by the average of the daily maximum and minimum or by the observations at various hours corrected to the daily mean by using the normals for Toronto; mean temperatures are given for about two hundred and twenty stations, as also the absolute maximum and minimum and the mean daily range of temperature; the monthly and annual rainfall is given for about two hundred and fifty stations, and the monthly and annual snowfall for the same. In Part IV the amount of sunshine, as registered for each day of the year, is given for fourteen stations, and the temperature observed every two hours for each day of the year at Regina, Kingston, Montreal, and Quebec, and for each hour at Toronto. These

hourly and bihourly observations give valuable data for determining the corrections needed to reduce miscellaneous hours of observation to the normal mean.

The Report for 1896 appears in two volumes and has more than twice the bulk of that for 1895. During this year there were more than three hundred stations of observation, classified as follows: Chief stations, 8; telegraph reporting stations, 30; ordinary first-class, 17; ordinary second-class, 177; ordinary third-class, 68: sunshine stations, 14. Of course, some stations fall into two categories. At the chief stations, the telegraph stations, and a few of the special stations the observers are paid for their time, but at the great bulk of the stations the work is purely voluntary, and the thanks of the public are due to those who, in the interest of their country and of science, devote their time gratuitously to the work. There are thirty telegraph stations whose reports are received in Toronto before 9:30 a. m., and which, combined with fifty-four reports received by exchange from the United States, enable the director at Toronto to issue maps and forecasts similar to those that are published at Washington. There are sixty-seven storm signal stations, thirty-two of which are on the Great Lakes. The daily forecasts are disseminated to agricultural communities and the general public promptly and widely.

The second volume of the Report for 1896 is occupied by Part V, which part does not appear in the report for 1895. This large volume is wholly occupied with minute details of the results of observations at the chief stations during the year 1896. There are eight chief stations, viz: Esquimault, B. C.; Winnipeg, Man.; Toronto, Ont.; Woodstock, Ont.; Montreal, Que.; Fredericton and St. John, N. B., and Halifax, N. S. For each of these stations the Report gives for each hour and day the complete record of the pressure, temperature, vapor pressure, relative humidity, cloudiness of the sky, the dry air pressure, the wet-bulb thermometer, and the dew-point. The whole record occupies 500 quarto pages and responds very closely to the requests of the International Meteorological Conference for the publication of detailed records at a few stations. It is a noble contribution of data needed for the study of climatology in its relation to every matter that interests civilized humanity.

THE ANNUAL SUMMARIES OF THE CLIMATE AND CROP SERVICE.

In looking over the annual summaries for 1898 of thirty-seven different sections of the Climate and Crop Service of the Weather Bureau, which are all that have been received up to date, one can but be impressed with the great mass of popular and valuable climatological data thus published in detail. Each summary consists of about five pages of numerical tables, three charts, and from three to seven pages of text. These summaries alone, without the accompanying monthly section reports, will when bound up together, present the general climatic conditions of the year in a form appropriate for many interesting studies into the relations between the climate on the one hand, and the agriculture, forestry, transportation, hygiene, and other important matters.

We notice a very few cases in which the respective section directors have added to these summaries some special study. As the section directors have frequently been encouraged by the Chief of Bureau to publish special memoirs in each annual summary, it may be possible that other papers will be found in the summaries that have not yet been received, viz, those for Michigan and North Dakota.

Mr. E. A. Evans, as section director for Virginia, has compiled a very instructive article on the physical features and flood conditions of the James River Valley, illustrated by hydrographs for Lynchburg and Richmond. This study is especially in line with the investigations now being carried on by the United States Geological Survey.

For California, Mr. McAdie gives a suggestive article by Mr. A. H. Bell, Weather Bureau observer, on the weather conditions along the coast of northern California. For Florida, Mr. A. J. Mitchell gives an instructive chart, showing the limit of freezing temperatures. For Georgia, Mr. J. B. Marbury reprints a short article by Mr. John Hyde, Statistician. For Kansas, Mr. T. B. Jennings reprints a portion of the annual snowfall bulletin of the Colorado section, also an annual summary for the University of Kansas. For Missouri, Mr. A. E. Hackett reprints a portion of Professor Hammon's bulletin on frost prevention. For Nebraska, Mr. G. A. Loveland gives a small chart of the distribution of snowfall during the year 1898. (Is the total annual snowfall for the first and last months of a calendar year as important to agriculture as the total for the four or five months of consecutive cold during one winter?)

For Maryland and Delaware, Mr. F. J. Walz gives diagrammatic curves, showing the relation between monthly normal temperatures or rainfall and the corresponding actual curves for the year, that are very instructive. The prevailing warmth of January, February, and March, the coldness of April, the warmth of the growing season, May 15 to October 15, and the coldness of November and December stand out very clearly.

Among these annual summaries we notice that those for Maryland, Iowa, New Jersey, and New York differ somewhat from other reports, possibly because published partly at the expense of the respective States. Iowa, in fact, compresses its annual summary into a single table appended to the monthly report for December. The annual summaries for Michigan, Nevada, New Jersey, and North Dakota have hitherto usually appeared as octavo pamphlets, but would it not in some cases be practicable, after printing off the octavo edition and before the type is distributed, to arrange the tables in a form appropriate to the quarto page and print a small edition for binding up with the monthly reports?

THE CLIMATE ADAPTED TO TOBACCO.

In the report of the Virginia section for May, Mr. E. A. Evans, Section Director, gives a summary of our knowledge of the soil and climate adapted to raising tobacco. So far as climate is concerned, tobacco raising is profitable over a very wide extent of territory throughout the world. The range of climate that is found in the United States by no means exhausts the adaptability of the plant; in fact, with tobacco it is as much a question of soil as of climate. The climatic peculiarities of the regions in which the best tobacco is grown are not especially dwelt upon by Mr. Evans, but would make an interesting subject for study. The cultivated plant is evidently more susceptible to weather than the native tobacco of Virginia, and is, probably, the descendant of some variety imported by the early settlers, so that both soil and climate must be adapted to it. In general, the agriculturist labors to overcome the natural climate of any spot, and his resulting crop represents not the plant, or the soil, or the climate, but the intelligence of the skilled labor.

We hardly know how one should proceed in order to obtain botanical or agricultural material for a fair comparison between different climates as to their effect upon any given plant. The question of the relation between climate and crop belongs to the Division of Soils even more than to the Weather Bureau, since the meteorological climate must be considered in connection with the underground conditions. The roots have one climate, the leaves and the fruit have another; the crop results from a combination of both, with a very large admixture of agricultural skill.

THE DURATION OF THE GROWING SEASON FOR 1898.

The Editor has extracted from the annual summaries of the Climate and Crop Service some details as to the length of the growing season, so far as it is controlled by temperature, during the year 1898. The following table gives a summary of the dates of the last spring and the first autumn frosts; it gives only the approximate mean date for a State or section of a State. The actual dates at any station may have been ten or fifteen days earlier or later, but the total length of the season at any point in the State will scarcely vary ten days from that here given.

State.	Average date of frost.		Length of season.
	Last spring.	First autumn.	
			Days.
Georgia (southern)	March 15	October 26	226
Georgia (northern)	April 7	October 25	201
South Carolina (coast)	March 1	November 28	273
South Carolina (interior)	April 1	October 27	210
North Carolina	April 15	October 25	194
Maryland and Delaware	April 15	October 30	199
New Jersey	April 7	October 17	194
	May 10	October 28	172
West Virginia	April 10	October 30	180
Texas (coast)	none	December 10	345
Texas (northern)	April 1	October 24	207
Mississippi	March 20	October 30	225
Arkansas	April 1	October 25	208
Oklahoma	April 7	October 20	197
Missouri	April 11	October 20	193
Wisconsin	May 1	September 20	143
Minnesota (southern)	May 5	September 15	134
Minnesota (northern)	May 20	September 9	113
South Dakota	May 1	September 21	144
California (northern coast)	January 28	November 20	297
California (middle)	February 23	December 1	282
California (southern)	March 28	November 15	232
	April 7	November 15	222
California (special regions)	May 6	November 10	168
	May 23	October 1	132

RIBBON LIGHTNING.

The annual report for 1897 of the G. V. Juggarow Observatory Vizagapatam, India, contains some special remarks on the thunderstorms of that year. The sudden oscillations of pressure and temperature are shown by the self-recording instruments. On June 2 the record says:

> A light shower fell, with a gust of wind from the north, and lasted for an hour. The peals of thunder were not very loud nor frequent. The flashes of sheet lightning were very frequent, but there were only a few flashes of forked lightning. One flash of forked lightning which appeared to the south was particularly vivid, having the appearance of a broad ribbon perpendicular to, and extending below, the horizon. The color of some flashes approached a light mauve, possibly due to the amount of dust in suspension in the atmosphere.

So far as we know, the ribbon feature of lightning has hitherto only been detected by means of photography. This seems to be the first case in which it was apparent to the naked eye.

UNNECESSARY TORNADO ALARMS.

Under date of May 12, Mr. J. I. Widmeyer, section director for Oklahoma, says:

> Long-range forecasters, through their ignorant predictions of tornadoes, are causing much unnecessary alarm to the inhabitants of Oklahoma. Not a single tornado has occurred this year, very few in other years, and the Weather Bureau has not as yet issued a single forecast "Conditions favorable for severe local storms;" but, in spite of this, every time a thunderstorm occurs, or a rain cloud appears in any part of the sky, accompanied by even moderate winds, every cave and cellar is filled with frightened men, women, and children. This undoubtedly causes more deaths as a result of exposure in these damp places than have been caused by all the tornadoes that ever occurred, while the constant fear and excitement have certainly a tendency to cause nervous troubles.

Of the three conditions necessary for the formation of tornadoes, two are distinctly local and can be ascertained by any one without the aid of a hygrometer or even a thermometer. Even should the two local conditions exist there need not necessarily be any cause for alarm, as the third condition which locates areas favorable for storms may be entirely absent. But when we have a temperature of about 70° in the early morning and a sultry humid atmosphere during the forenoon, surface winds fitful and changeable, and when clouds are observed moving in both a northerly and southerly direction, with erratic changes, the southwestern sky in such cases should be carefully scanned, for should danger be imminent it will come from that quarter. Tornadoes occur oftenest in the afternoon and evening, very rarely at night or forenoon.

It seems wise and necessary for the officials of the Weather Bureau to improve every occasion to allay the unnecessary alarm that pervades the community whenever one mentions the subject of tornadoes. Twenty years ago, when the Bureau began to collect and publish fairly correct statistics relative to these storms, the sum total of their number and the attendant destruction was so large as to be very impressive. The figures gathered by the meteorological reporters, purely for meteorological study with a view to the prediction of storms, were converted by sensational writers into a most alarming picture of the condition of the atmosphere in this country. Kansas, Iowa, and other portions of our fair land, became known as "tornado states." Many were frightened away from these States, and those who remained suffered unnecessary terror. Out of the natural desire to avoid a reputation for frequent tornadoes there grew a widespread determination to avoid the use of the word. Good citizens would allow that on very rare occasions they had an occasional "twister" or cyclone, a whirler or cloud-burst, a hailstorm or hurricane, but *never* a *tornado*. Newspapers shunned the word and insisted on using evasive terms.

In 1884 the Editor prepared for the proposed fourth edition of a little pamphlet entitled: "Weather Maps and How to Use Them," a table of relative frequency that clearly showed, not only the small chance of injury from tornadoes, but also that the chance was just as great in many small eastern States as in the large western States that had come especially under the ban of popular writers. One of the latter even went so far as to upbraid him with shirking his duty in that he did not join in the popular cry "beware of the western tornado."

There is really no more destruction done by tornadoes than by lightning, high winds, hailstorms, droughts, and floods, or other meteoric visitors. Fear and dread are inspired by the general knowledge that harm may occur, but fright and panic do not seize one until the dreaded apparition is at hand and visible. Fright is largely a matter of the nerves and the imagination; fear, of the intellect. Fright is not subject to reason, but fear may be so. By a careful, reasonable study of the maps of tornado tracks our observers will always be able to calm the minds of the citizens. It is unnecessary to resort to the caves and cellars, or to stop our ordinary avocations for fear of a tornado, until we see the cloud in the distance, or are positively certain that one is about to pass near us.

THE CAMPHOR BAROMETER.

A recent number of the weekly bulletin of questions and answers, published by the Secretary of the French Association for the Advancement of Science, submits the following problem:

How can we explain the formation of clouds, threads, and crystals that are produced in the so-called chemical or camphor barometer, which consists of a solution in alcohol of equal parts, of three substances, the nitrate of potash, camphor, the hydrochlorate of ammonia, if the glass tube that contains this solution is hermetically sealed, and the varia-

tions of temperature to which it is subjected have no influence on the phenomenon?

This form of barometer is found everywhere in English-speaking countries under the names of "the farmers' weather glass," "the domestic barometer," or some other equally misleading title. In some forms that the Editor has tested, there is scarcely any apparent change in the clearness of the liquid, year after year. In other instruments, the crystals of camphor assume different forms, from day to day, which are certainly very interesting to observe and study, but have nothing to do with the weather and storms, and even less than one would expect, with the current temperature. To the meteorologist and farmer, these instruments have no value, but to the student of molecular physics, they are well worth an investigation.

The gas in the space above the liquid being a mixture of air and vapor of alcohol exerts a very variable pressure upon the liquid below; the latter is saturated with the three chemicals above mentioned, but as its temperature and pressure vary, it alternately rejects and absorbs a slight surplus of camphor. The rapidity with which this change takes place appears to decide the question as to the crystalline or fibrous structure of the visible cloud. Nearly all the changes in the appearance of the camphor cloud seem to depend upon the rate at which the changes of temperature take place, and the time that is given to the solid to collect into larger crystals and settle to the bottom or rise to the top, according to the relative density of different parts of the liquid. The ascending and descending currents going on within the liquid are slow and barely appreciable, but must have an effect upon its cloudy appearance.

AN OBJECTIONABLE NEW METEOROLOGICAL TERM.

The Weather Bureau does not adopt a new term or modify the usage of old terms until such change has come to have a well established meteorological and scientific use. Its own publications can only be made intelligible to its readers by a mutual agreement that each party adopt standard English both as to grammar and dictionary. Thus, when we predict a hurricane, it is not to be questioned that we mean an extensive, destructive storm of wind, and we do not mean a thunderstorm or a tornado, or even, necessarily, a heavy rain. When we predict thunderstorms or tornadoes, we do not mean cyclones or hurricanes or general windstorms or dust whirls. When we predict blizzards, we do not mean "snow tornadoes." This last expression is the newest addition to the sensational or Dolly Varden system of nomenclature that finds favor with some popular writers. So far as we know it first appeared in the North American Review for January, 1899, page 121, where it is used by Dr. F. L. Oswald without any special definition, as though it were a term familiar in every day use. He applies it to the front of a blizzard "that flies 400 miles farther south before it gets finally arrested for trespass on the reservation of the actual Tropics." He speaks of "the snow tornadoes that sweep from the polar regions to the very gates of the Tropics as distinctly an American institution as * * * ," and again, of "the much maligned snow tornadoes that traverse a bee line route equaling the distance from northernmost Norway to the center of the Sahara." From these three expressions we judge that the snow tornado is equivalent to what is known in America as the blizzard and in Russia as the buran.

The combination of snow and high wind, followed by very low temperatures, that constitutes the blizzard, has no right to be called a tornado. The violence of the wind does not in the slightest degree approach that of a tornado or even that of a well-developed hurricane. The wind of the blizzard is a straight-line, horizontal wind, sometimes rolling back on itself; the wind of the tornado has a steep ascent and something of a whirl round a vertical axis. In the tornado a sudden barometric depression occurs and the air within a building expands outward and tears the building to pieces; in a blizzard there is no conspicuous fall in pressure, but a rapid rise as soon as the wind strikes the station. The tornado occurs in warm weather and has its origin in a cloud immediately above the station; the blizzard occurs in cold weather and has its origin in a very extensive mass of cold, dry air.

Snow whirls, like dust whirls, have nothing tornadic in their nature or origin; they occur in connection with blizzards, but do not convert the blizzard into a tornado.

One might as well speak of a tornado as a "warm-air blizzard" as to call a blizzard a "snow tornado," and we hope that neither expression will take hold of the popular fancy. The words blizzard and cold wave have come into recognized popular and scientific use since the Weather Bureau was established in 1870; they were expressive and frequently needed as convenient terms for daily use, but we hardly see the necessity for this newest term. We are curious to learn whether there is any locality where the term "snow tornado" is in use.

For the present the MONTHLY WEATHER REVIEW will continue to use the words hurricane, typhoon, cyclone, low pressure, high pressure, thunderstorm, tornado, and blizzard in their well-recognized scientific meanings.

WEATHER BUREAU MEN AS UNIVERSITY LECTURERS.

Many of our colleges and universities have, during the past twenty years, expressed a desire to secure instructors in meteorology, but have expressed regret that funds are not available for the establishment of full courses of instruction in the subject.

Fortunately, however, among the Weather Bureau officials may be found many who are willing to devote a portion of their time to the instruction of young men, and occasionally the employes of the Bureau receive invitations to deliver courses of lectures that must, eventually, as we fondly believe, lead to the full recognition of meteorology as an important branch of study.

The latest action in this respect has been that taken by the Board of Regents of the University of California, on June 16, when Mr. Alexander McAdie, Forecast Official of the Weather Bureau, was appointed "Honorary Lecturer on Meteorology, in the University, for the academic year 1899–1900." Prof. A. O. Leuschner, at the head of the department of civil engineering and astronomy, upon learning of this appointment, added: "I hope that we may now succeed in building up a department of meteorology in the University." We can not doubt but that many students of the subject will listen to Mr. McAdie's course of lectures, and that much good will be done thereby, but if a department of meteorology is to be built up in the University it must be done by the consecration of one's whole time and energy to that work, as is shown by the pioneer work done in this line by Prof. Wm. M. Davis and R. DeC. Ward, at Harvard University.

We notice that by a recent decision of the faculty of Harvard, meteorology has been placed on the list of subjects that may be offered for examination by young men who desire to enter the freshman class of that institution. This is in accord with the growing tendency to introduce the study of elementary meteorology into the high schools and preparatory collegiate academies of the country.

During the past year Dr. O. L. Fassig has not only completed his own studies for the degree of Ph. D., being the

first one in America to receive that degree from an American university for work done in meteorology, but has also carried on a course of thirty lectures on climatology before the graduate students in the department of geology in Johns Hopkins University. He has also given lectures to the teachers of the public schools of Baltimore. During the coming year it is expected that the lectures to university students will be continued and a still more extensive course on climatology will be given to the teachers of the city. The recent efforts of this university to reach the teachers of public schools in Baltimore, though the lectures by Drs. Fassig and Shattuck have been remarkably successful and one might suggest that an effort be made, in a similar way, to reach the teachers in the whole State of Maryland.

Why should not the State Normal schools and similar organizations engage Weather Bureau men to carry on systematic instruction in meteorology? The Editor is often asked to recommend a good text-book. Why may he not also have an opportunity to recommend a good lecturer? Such talks as are given by many of our observers would, we are sure, be a welcome and popular addition to the courses of instruction in summer schools and other places where the teachers are accustomed to congregate, and where they get new ideas and advanced methods in school work.

THE CONFLICT OF MAN WITH THE CLIMATE.

A correspondent inquires whether plants have any influence upon climate, and complains that the destruction of pine forests in southern Alabama seems to have produced disastrous droughts, and that the climate has entirely changed in that section. The following extracts from the Editor's reply are applicable to occasional similar complaints from other parts of the country:

You will find much information as to the influence of trees upon climate in Bulletin No. 7 of the Forestry Division of the Department of Agriculture. As to the general influence of vegetation upon the weather, this matter has been discussed in a popular and indefinite manner for many generations, but the technical or scientific discussion has long since been abandoned, as it is certain that the influence of vegetation upon the weather is quite inappreciable. Our weather at the ground depends upon the clearness of the sky, and that depends principally upon the clouds, which in turn depend upon the moisture in the air. The fundamental question is whether the air is ascending to make clouds or descending to make clear, dry weather, or whether moist air will cool by radiation and form a temporary fog during the night.

With regard to any possible injurious change in the amount of rainfall or in the climate in your locality, which seems to be the feature that you especially refer to, I would say that the records of the past century do not support the idea that there has been any permanent change. Everywhere throughout the globe the rainfall is subject to great variations as to its amount and the manner in which it falls; sometimes at night and sometimes by day; sometimes in many little showers and sometimes in a few heavy floods; sometimes droughts in summer and rains in winter; at other times rains in summer with dry winters, but no steady secular changes are known. The oscillations are so frequent and sometimes so extreme that they set at naught all attempts to foresee them. In general, droughts that really injure vegetation are not confined to small regions, but extend over half a continent, and may move slowly but regularly around the whole globe in the course of two or three years. The injury done by a drought is due, not so much to the lack of rain as to the drying influence of the air and the wind. Often there is enough moisture in the soil, down to depths of 3 to 6 feet, to supply all the needs of vegetation during a year's drought, provided only it can be properly conserved; but, in fact, it rises to the surface and is wasted by the drying wind, in place of being utilized by the plant. Prof. Milton Whitney, Chief of the Division of Soils, has pointed out regions in California where such great amounts of moisture are stored away in the deep soil and such admirable conditions exist in the surface soil that the moisture is conserved indefinitely and the plants thrive without either rain or artificial irrigation.

Inasmuch as we know that droughts and floods, storms and frosts must have frequently occurred in any given locality, therefore, when we cultivate the land and plant our crops, we do so in full knowledge of the impending chances of disaster, and have no right to expect uninterrupted immunity and prosperity. Never in the history of the world has it ever been possible for any one to carry out to successful completion his schemes and plans without an intense struggle against all forms of opposition. In this struggle it is not so much the strongest will as it is the highest intellect that succeeds. In the course of time almost every one, by studying his own surroundings, learns enough to enable him to achieve a moderate amount of success in any new enterprise. So far as the weather is concerned, the Weather Bureau will send you the earliest possible predictions, so that you may take precautions against injury from wind or flood or frost.

Man is so constituted that, although individuals may fail, yet the race, as a whole, is being steadily improved and developed by its conflict with nature.

WIDESPREAD AREA OF DROUGHT OR COLD.

In connection with the severe winter and spring of 1899, the editor of the Boston Journal (April 8) calls attention to the curious psychic phenomenon that in New England the belief that the climate had become milder has now changed about, and old inhabitants are inclined to acknowledge that the old-fashioned winters have come back again. On the other hand, in the Southern States the popular belief is that the climate has suddenly become more severe, forgetting that equally severe winters have occasionally occurred in that section ever since the country was first settled. We must, therefore, conclude that there has been no change in the average climate of either the northern or southern regions.

The Editor would call attention to the fact that in the South the severe winter of 1835 was preceded and followed by other winters of extraordinary harshness, and so was the memorable winter of 1886 and that of 1894–95, and so finally that of 1898–99. It might almost be accepted as a rule that the severest winters are but the climaxes of periods of unusual refrigeration. Between these cold periods come the warm years.

In the MONTHLY WEATHER REVIEW for 1896 we several times called attention to the fact that a disastrous drought is usually the result of the cumulative effect of several years of light rain or drought; also that such droughts are not confined to a small region, but move slowly during several years over the face of the globe. The gradual spread of the great cloud of vapor and dust ejected from the volcano of Krakatoa in July, 1884, lasted for several years. During the first few months it quickly surrounded the globe in the equatorial region, then it spread slowly north and south until its influence was felt in latitude N. 60° and S. 50°. One can but suppose that this demonstration of the gradual overflow of vapor in the upper regions from the equator toward either pole also applies to frequent analogous overflows of hot air, electrified air, and possibly other meteorologic elements. If this hypothesis be allowable, it will be worth while to seek for many diverse confirmations of the general rule that at any place throughout the globe any remarkable period of warm or cold, dry or wet weather is but the culmination of a series of less remarkable phenomena of the same character. This idea can be best tested by a series of daily maps like those of the Bulletin of International Simultaneous Meteorological Observations, or by the monthly maps that Professor Hildebrandson has prepared. Such studies must lead to seasonal forecasts on a correct basis of observation and induction.

RAINFALL AT HIGH STATIONS.

The hydrographer to the United States Geological Survey, Mr. F. H. Newell, as also his assistant, Mr. Henry A. Pressey, desire to call attention to the fact that inasmuch as Weather Bureau stations of all kinds are generally located in river

valleys or lowlands, therefore the records of rainfall represent the valleys and not the hilltops. This is a very serious matter in mountainous countries, and especially in those portions of the United States where it is important to know the quantity of water available for irrigation.

Mr. F. H. Brandenburg, of Denver, has labored with great success to overcome this difficulty in Colorado. By his unceasing efforts he has secured a large number of rain and snow observations at high altitudes where the rainfall is many times as great as in the valleys. It is now necessary to make a special effort of similar nature with reference to California, Arizona, and New Mexico, and, in general, for the whole arid and Plateau regions. Cases have occurred in western Montana, where the flow of water from a small stream was two or three times as great as the rainfall on its watershed, so far as that could be inferred from a few rainfall stations in the lower valley. Evidently these latter gave no idea whatever as to the rain and snow on mountain tops, from which the river derived its great excess of water. There can be no proper determination of the amount of water available for irrigation, and no explanation of the variable heights of water in the rivers unless we have a sufficient number of gages at high and low stations. Every opportunity to secure a new rainfall observer should be gladly embraced.

PHYSICS AND METEOROLOGY IN THE UNIVERSITIES.

The progress of meteorology depends not merely upon the observer and the compiler of daily weather maps, but more than anything else upon the education of the physicists who are attracted to this branch of science. The study of physics embraces every detail of the many ways in which force acts upon matter. The study of heat, light, or electricity, is the study of the phenomena that are manifested when molecules and atoms interact upon each other. The study of projectiles, the flow of water in the rivers, the motions of the atmosphere, or the tides of the ocean is the study of the action of larger masses of matter under the influence of such forces as the attraction of gravitation, the repulsion due to heat, the centrifugal force due to inertia. We may experiment upon small quantities of air and aqueous vapor in the physical laboratory, and thus learn some of the details as to the physical properties of the atmosphere; but the meteorological phenomena on a large scale can only be studied by means of the daily weather map and with the help of mathematical formulæ, or equivalent graphic methods peculiar to hydrodynamics and thermodynamics. It is evident, therefore, that important progress in meteorology is not to be hoped for from those who only frame hypotheses and speculations as to possible laws that may control atmospheric phenomena. Such hypotheses are often important; it is well said that even the clear statement of a difficulty, or of a problem, is already a long step toward its solution. But the solution is the final step that meteorology demands, and the one that is absolutely essential in order that we may really make true progress. Meteorology presents many unsolved problems, and many more will be recognized as time goes on. The successive steps involved in resolving these problems usually consist of (1) a series of successive hypotheses; (2) the testing of each hypothesis by comparison with observation and the laws of physics; (3) the modification of the hypotheses until we attain one that harmonizes with all that is known on the subject. This process involves a training in mathematics and physical experimentation, and a development of an insight into the ways of nature that does not come naturally to every one. Sir Isaac Newton is an example of those who, by persistent thought and carefully checking every step by comparison with nature, at last penetrate into some of nature's secrets.

Most of us must be content to be good observers, computers, and workers. A few may become bold and successful forecasters, but it is not likely that important additions to our knowledge of fundamental points in meteorology will be made by any except those who have gone through a severe training in the physical laboratories and methods of original research. Therefore, those interested in the progress of our science must look about with some solicitude inquiring what is being done in our American universities to turn the thoughts of earnest students toward meteorology as a branch of physics. Universities are distinguished from colleges in that they offer young men and women special opportunities for original research. They do not usually confer the degree of doctor of physics (Ph.D.) or doctor of science until the student has prepared one or more papers based on his own studies and work, and containing some substantial additions to our knowledge. A slight examination of the titles of these theses during the past few years shows that scarcely one has taken for his subject any problem that is strictly meteorological. This is probably not due to a want of interest in our science on the part of the student or the general public, but may often be traced back to the teacher himself. The universities generally prefer to consider meteorology as a rather insignificant division of the physical sciences; some of them class it with astronomy, others with geography, but in general none of them give it any prominence in the curriculum of studies, or have any special conveniences for instruction therein.

As many of our readers are turning their attention strongly toward meteorology, and inquiring as to courses of study and the attainment of the post graduate degree of Ph. D. in this science, we recommend them to examine the "Graduate Handbook" for 1899, which is published by the Federation of Graduate Clubs, and is intended to show the present condition of graduate instruction.

THE CLIMATE AND CROP SERVICE IN PORTO RICO.

The Porto Rico Section of the Climate and Crop Service of the Weather Bureau was established in the summer of 1898, and its publications have hitherto consisted of weekly bulletins, showing especially the condition of the crops. It was, of course, very desirable that the monthly reports of this section should be printed in quarto form, conformably to the general plan of publication adopted for all of the forty-five sections of this service. But both the difficulty and the expense of such a publication in Spanish and English have hitherto stood in the way, and at first it did not seem possible to overcome these. But now an arrangement has been made by which the composition, chalk-plate work, and printing are done by Mr. E. A. Evans, Section Director at Richmond, Va., while the manuscript is supplied by Mr. R. M. Geddings, the Section Director at San Juan. It is, therefore, to the cooperation of these two directors and to their proverbial enthusiasm that we owe the publication of the report of the Porto Rico Section for May, 1899, as Volume I, No. 1 of the series. Possibly, the report for December, 1899, may be followed by a summary of the whole year so complete as to represent all that the Weather Bureau has done since the summer of 1898.

This first number gives, as usual, full page sketch maps of Porto Rico, with the mean monthly temperature, wind, and rainfall for May, 1899. The isotherm of 80° F. probably skirts the greater part of the southern and northern coast lines; it cuts off a small portion of the eastern end of the island and a much larger portion of the western end. A small area of mean temperature of 82° F. exists in the south-

western corner, but, doubtless, the 80° isotherm will again be found just off the coast. Within this large area of 80°, the mean temperature diminishes to 74° or less as we ascend into the mountainous interior. It is doubtless owing to the prevailing northeast winds that the small region of 82° lies southwest, viz, to leeward, of the mountainous region. The winds and mountains also control the distribution of rainfall. The regions of small rainfall are two, viz, (1) in the southwest, where high temperature, minimum cloudiness, and descending winds prevail; (2) in the east where the northeast trade, after rising over the hills of Humacao and San Juan de Porto Rico, descend into Cayey and the valley of the Loiza, giving light rains and little cloudiness for a small portion of that region. The region of heaviest rainfall extended from western Ponce to the northern coast; the rainfall was also large at the extreme northeastern and northwestern corners.

The only stations for which the average rainfall is known so as to admit of comparisons are San Juan, Luquillo, and Mount Yunki, all three of which report less this year than the normal values. The greatest amount recorded anywhere was 11.36 inches at La Isolina. On the average of 11 stations, there were 14 clear days, 10 partly cloudy, and 7 cloudy days. The number of rainy days varied from 3, in the district of San German, to 11 or 12 in Arecibo and 19 or 20 at Luquillo and Mount Yunki, both in Humacao.

It is evident that about twice as many meteorological stations at carefully selected locations are still needed in order to better represent the distribution of rainfall. As the total area of the island is about 3,750 square miles, and its surface is very much diversified by hills and valleys, the 34 stations already established can only be considered as the first step toward the investigation of the many peculiarities of climate and the discovery of innumerable small regions adapted to the cultivation of special crops.

Mr. Geddings has not only published his meteorological text in both Spanish and English, but has added, in both languages, an excellent article on coffee cultivation by Capt. A. C. Hansard, of Luquillo, which will be helpful to any who may think of undertaking a plantation in Porto Rico.

THE WEATHER OF THE MONTH.

By ALFRED J. HENRY, Chief of Division of Records and Meteorological Data.

PRESSURE.

Atmospheric pressure was considerably higher than usual over all districts save the southern Plateau and the upper Missouri Valley. As compared with the preceding month pressure rose over the region extending from the Lakes and lower Missouri Valley southward to the Gulf and Mexican frontier, and fell along the northern boundary from the headwaters of the Missouri eastward to the mouth of the St. Lawrence. Pressure also fell markedly in California, Nevada, and Arizona.

TEMPERATURE OF THE AIR.

Average temperatures and departures from the normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	10	65.3	+ 2.1	+ 1.0	+ 0.2
Middle Atlantic	12	72.7	+ 1.8	− 2.0	− 0.3
South Atlantic	10	78.6	+ 1.5	− 1.8	− 0.3
Florida Peninsula	7	80.4	+ 0.6	+ 1.0	+ 0.2
East Gulf	7	80.0	+ 1.1	− 5.6	− 0.9
West Gulf	7	79.3	+ 0.3	− 6.0	− 1.0
Ohio Valley and Tennessee	12	75.5	+ 1.5	− 4.2	− 0.7
Lower Lake	8	68.3	+ 1.2	+ 1.3	+ 0.2
Upper Lake	9	63.3	+ 0.9	− 5.1	− 0.8
North Dakota	7	63.2	− 1.7	−19.2	− 3.2
Upper Mississippi	11	72.3	+ 1.1	− 9.3	− 1.6
Missouri Valley	10	71.6	+ 0.6	−12.0	− 2.0
Northern Slope	7	61.7	− 1.1	−24.3	− 4.0
Middle Slope	6	72.0	+ 0.4	−10.6	− 1.8
Southern Slope	6	61.9	− 1.7	− 0.5	− 0.1
Southern Plateau	13	76.1	− 1.7	− 5.1	− 0.8
Middle Plateau	9	64.2	− 0.6	− 9.3	− 1.2
Northern Plateau	10	59.5	− 2.0	−11.8	− 2.0
North Pacific	9	55.2	− 2.6	−11.2	− 1.9
Middle Pacific	5	62.0	+ 0.1	− 1.2	− 0.2
South Pacific	4	66.8	+ 0.2	− 1.5	− 0.2

The month was slightly cooler than usual in parts of the upper Lake region and generally throughout the Rocky Mountain and Plateau districts. It was warmer than usual in the great Valley of California, and generally east of the Mississippi River. Maximum temperatures of 100° and over occurred in the interior of the South Atlantic States, the Rio Grande Valley, and on the plains northward along the one hundredth meridian. Maximum temperatures ranging from 100° to 120° occurred throughout the desert regions of southern California, in Arizona and southern Utah.

In many localities the minimum temperatures of the month were remarkably low. Light to killing frosts were of frequent occurrence on the higher levels of Oregon, Idaho, Montana, Wyoming, and Colorado. Killing frosts occurred in parts of Hardin, Marion, and Allen counties, Ohio, on the morning of the 30th.

In Canada.—Professor Stupart says:

In no part of the Dominion did the mean temperature differ much from the average. The greatest departure was in Assiniboia and Alberta, where it was 3° to 4° below, and the greatest departure above was in various small districts in the vicinity of Lakes Huron, Erie, and Ontario, where it was about 3°. In Manitoba, Quebec, and the Maritime Provinces, the temperature was either just normal or a little above.

PRECIPITATION.

Average precipitation and departures from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		*Inches.*	*Inches.*
New England	10	2.46	83	−0.5	−0.7
Middle Atlantic	12	2.64	73	−1.0	−1.5
South Atlantic	10	3.36	65	−1.8	−2.6
Florida Peninsula	7	5.48	80	−1.4	−1.2
East Gulf	7	4.29	84	−0.8	−7.8
West Gulf	7	4.19	108	+0.3	−4.1
Ohio Valley and Tennessee	12	2.73	65	−1.5	−1.7
Lower Lake	8	1.79	50	−1.8	−2.4
Upper Lake	9	3.92	105	+0.2	−1.7
North Dakota	7	3.94	100	0.0	−0.5
Upper Mississippi Valley	11	4.78	104	+0.2	+1.4
Missouri Valley	10	4.51	102	+0.1	−1.8
Northern Slope	7	1.65	62	−1.0	0.0
Middle Slope	6	5.16	163	+2.0	+0.4
Southern Slope	6	5.61	160	+2.1	+0.8
Southern Plateau	9	0.63	147	+0.2	−1.7
Middle Plateau	13	0.78	162	+0.3	+0.8
Northern Plateau	10	0.54	40	−0.8	−1.2
North Pacific	9	1.46	62	−0.9	+4.2
Middle Pacific	5	0.47	82	−0.1	−1.9
South Pacific	4	0.61	555	+0.5	−1.7

Precipitation was unevenly distributed. Torrential rains fell in many places, while drought prevailed in others. The

drought in southern New England was broken during the first half of the month. Heavy rains fell over portions of Texas causing the most disastrous floods in the history of the State. Heavy rains also fell in Kansas and over a considerable strip of territory extending in a northeasterly direction to Lake Superior.

In Canada.—Professor Stupart says:

The rainfall has been below average in the southern part of Ontario from the upper St. Lawrence Valley to the St. Clair River, and particularly so in the counties bordering on Lakes Erie and Ontario; in northern Ontario and quite generally in the other provinces it was either equal to or above average, the most marked excess being along the north shores of the Georgian Bay and Lake Superior, and thence westward to Alberta.

HAIL.

The following are the dates on which hail fell in the respective States:

Alabama, 4, 22, 23, 30. Arizona, 2, 22, 23, 24, 25. Arkansas, 8, 23. California, 2. Colorado, 2, 6, 7, 8, 9, 13, 16, 20, 21, 22, 23, 25, 28. Connecticut, 20, 24. Florida, 1, 2, 3, 4, 15. Georgia, 29. Idaho, 3, 4, 5, 12, 13, 19, 26. Illinois, 1, 2, 5, 6, 23, 24. Indiana, 1, 3, 7, 18, 20. Iowa, 2, 13, 14, 17, 18, 19, 22. Kansas, 1, 2, 3, 4, 13, 14, 22, 25, 28. Kentucky, 9. Louisiana, 5, 23, 25. Maine, 20, 27. Maryland, 1, 2, 6, 9, 21, 24. Massachusetts, 19, 20, 24. Michigan, 5, 6, 12, 13, 18, 19, 21. Minnesota, 9, 10, 11, 12, 17, 23. Mississippi, 4, 7, 23, 28. Missouri, 1, 4, 14, 28. Montana, 5, 8, 11, 12, 13, 20, 22, 25, 26. Nebraska, 1, 2, 3, 7, 8, 9, 10, 11, 12, 13, 15, 16, 18, 22, 23, 24, 25, 26. New Hampshire, 5, 19, 20. New Jersey, 6, 15, 20, 24. New Mexico, 15, 16, 28. New York, 6, 20, 21, 23, 24, 25, 28. North Carolina, 8, 9, 21, 29. North Dakota, 3, 10, 15, 16, 19, 21, 22, 23, 29, 30. Ohio, 1, 6, 19, 20, 24, 27. Oklahoma, 1. Oregon, 24. Pennsylvania, 1, 5, 6, 20, 23, 24, 28. Rhode Island, 24. South Carolina, 1, 2, 11, 28, 29. South Dakota, 1, 2, 4, 10, 21, 26. Tennessee, 8, 25, 28. Utah, 1, 2. Vermont, 19. Virginia, 1, 10, 25. Washington, 5, 26, 28. West Virginia, 1, 6, 20, 23, 24. Wisconsin, 2, 4, 12, 17, 18, 19, 22, 27. Wyoming, 1, 2, 3, 4, 19, 24.

WIND.

The maximum wind velocity at each Weather Bureau station for a period of five minutes is given in Table I, which also gives the altitude of Weather Bureau anemometers above ground.

Following are the velocities of 50 miles and over per hour registered during the month:

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Abilene, Tex	2	51	se.	Point Reyes Light, Cal.	1	60	nw.
Amarillo, Tex	1	54	w.	Do	2	60	nw.
Bismarck, N. Dak.	30	52	nw.	Do	5	50	nw.
Cape Henry, Va.	9	50	nw.	Do	11	70	nw.
Do	29	65	nw.	Do	12	70	nw.
Mount Tamalpais, Cal.	1	60	nw.	Do	13	72	nw.
Do	11	86	nw.	Do	24	58	nw.
Do	12	72	nw.	Do	25	50	nw.
Do	23	78	nw.	Sioux City, Iowa	3	57	s.
Do	24	55	nw.	Williston, N. Dak.	6	52	nw.
New York, N. Y	29	66	nw.				

LOCAL STORMS AND TORNADOES.

Severe local storms, some of which were tornadic in violence, occurred on the following dates and in the States named:

1st, Kansas and Indiana; 2d and 3d, Iowa; 4th, Wisconsin and Iowa; 5th and 8th, Indiana; 10th, North Carolina; 11th, Iowa; 12th, Wisconsin; 13th, Nebraska and Iowa; 17th, Minnesota, Wisconsin, and Iowa; 19th, Wisconsin; 20th, Illinois, New York, and Colorado; 21st, Nebraska and Iowa.

Much damage was done by lightning. Reports were received showing the death of 130 persons from lightning stroke.

HUMIDITY.

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
	%			%	
New England	74	− 6	Missouri Valley	72	+ 3
Middle Atlantic	71	− 2	Northern Slope	55	− 1
South Atlantic	75	− 3	Middle Slope	61	+ 2
Florida Peninsula	78	− 3	Southern Slope	66	+ 6
East Gulf	72	− 3	Southern Plateau	33	+ 5
West Gulf	76	+ 2	Middle Plateau	33	− 4
Ohio Valley and Tennessee	69	− 1	Northern Plateau	52	0
Lower Lake	67	− 5	North Pacific Coast	74	− 5
Upper Lake	73	0	Middle Pacific Coast	60	− 5
North Dakota	72	+ 4	South Pacific Coast	69	+ 5
Upper Mississippi	70	− 1			

ATMOSPHERIC ELECTRICITY.

Numerical statistics relative to auroras and thunderstorms are given in Table VII, which shows the number of stations from which meteorological reports were received, and the number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month, respectively.

Thunderstorms.—Reports of 5,253 thunderstorms were received during the current month as against 5,455 in 1898 and 5,305 during the preceding month.

The dates on which the number of reports of thunderstorms for the whole country were most numerous were: 24th, 311; 1st, 308; 20th, 276; 14th, 272; 28th, 261.

Reports were most numerous from: Pennsylvania, 265; Iowa, 256; Illinois, 248; Nebraska, 240; New York, 229.

Auroras.—The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four preceding and following the date of full moon, viz, 19th to 27th.

The greatest number of reports were received for the following dates: 29th, 88; 28th, 38; 30th, 12.

Reports were most numerous from: New York, 24; Wisconsin, 15; Iowa, Massachusetts, and South Dakota, 13; Minnesota, 12.

In Canada.—Auroras were reported as follows: Grand Manan, 29th; Quebec, 3d, 28th, 29th; Montreal, 28th, 29th; Toronto, 28th, 29th; Kingston, 28th, 29th; Port Stanley, 28th; Saugeen, 28th; Minnedosa, 9th, 27th; Swift Current, 29th.

Thunderstorms were reported as follows: Sydney, 14th; Halifax, 6th; Grand Manan, 5th, 6th, 7th, 26th; Yarmouth, 6th, 16th, 25th; Ottawa, 20th; Charlottetown, 26th; Chatham, 21st, 29th; Father Point, 13th, 21st; Quebec, 1st, 5th, 17th, 20th, 21st, 23d, 24th; Montreal, 5th, 17th, 19th, 23d; Bissett, 18th, 26th; Toronto, 6th, 7th, 8th, 14th; White River, 4th, 6th, 14th; Kingston, 5th, 6th, 7th, 19th, 20th, 23d; Port Stanley, 1st, 4th, 5th, 6th, 7th, 14th; Saugeen, 5th, 6th, 22d; Parry Sound, 4th, 6th, 7th, 14th, 20th, 22d; Port Arthur, 4th, 5th, 7th, 12th, 13th, 17th, 25th; Winnipeg, 4th, 11th, 17th, 18th, 21st, 27th, 29th, 30th; Barkerville, 23d; Minnedosa, 1st, 3d, 16th, 17th, 23d, 26th, 28th; Qu'Appelle, 11th, 12th, 20th, 22d, 23d, 26th; Medicine Hat, 10th, 11th,

22d, 26th; Swift Current, 7th, 10th, 11th, 20th, 22d, 26th, 28th, 29th, 30th; Prince Albert, 10th, 22d, 23d, 26th; Edmonton, 2d, 25th; Battleford, 11th, 22d, 26th; Bermuda, 16th, 18th, 27th, 30th.

SUNSHINE AND CLOUDINESS.

There was more than the normal amount of sunshine in the majority of districts.

The distribution of sunshine is graphically shown on Chart VII, and the numerical values of average daylight cloudiness, both for individual stations and by geographical districts, appear in Table I.

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	5.1	0.0	Missouri Valley	4.7	−0.1
Middle Atlantic	4.7	−0.3	Northern Slope	4.7	−0.1
South Atlantic	4.2	−0.7	Middle Slope	4.2	+0.5
Florida Peninsula	4.9	−0.6	Southern Slope	4.0	−0.4
East Gulf	4.1	−0.7	Southern Plateau	2.2	+0.3
West Gulf	5.0	+0.4	Middle Plateau	2.6	−0.4
Ohio Valley and Tennessee	4.2	−0.8	Northern Plateau	4.3	−0.8
Lower Lake	3.8	−1.1	North Pacific Coast	6.0	−0.1
Upper Lake	5.0	−0.2	Middle Pacific Coast	2.0	−1.2
North Dakota	4.4	−0.8	South Pacific Coast	3.4	+0.1
Upper Mississippi	4.6	−0.4			

DESCRIPTION OF TABLES AND CHARTS.

By ALFRED J. HENRY, Chief of Division of Records and Meteorological Data.

For text descriptive of tables and charts see page 164 of REVIEW for April, 1899.

TABLE I.—*Climatological data for Weather Bureau Stations, June, 1899.*

Stations.	Elevation of instruments.			Pressure, in inches.			Temperature of the air, in degrees Fahrenheit.											Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.			Wind.					Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Total snowfall.
	Barometer above sea level, feet.	Thermometers above ground.	Anemometer above ground.	Mean actual, 8 a. m. and 8 p. m. + c.	Mean reduced.	Departure from normal.	Mean max. and min. + 2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.						Total.	Departure from normal.	Days with .01, or more.	Total movement, miles.	Prevailing direction.	Maximum velocity. Miles per hour.	Maximum velocity. Direction.	Maximum velocity. Date.					
New England.							65.3	+ 2.1										74	2.46	— 0.5											
Eastport	76	69	74	29.88	29.97	+ .04	56.1	+ 1.0	76	3	65	42	9	48	32	51	49	84	2.58	— 1.0	16	6,271	sw.	30	e.		15	3	17	10	6.6
Portland, Me	103	81	89	29.84	29.94	.00	64.5	+ 1.2	93	5	74	48	7	55	43	57	52	67	1.04	— 2.3	8	5,322	sw.	24	nw.		30	7	19	4	5.1
Northfield	872	15	65	29.07	29.98	+ .05	63.2	— 0.4	90	5	76	35	11	50	40	59	54	68	1.60	— 1.9	12	6,498	s.	35	n.		15	8	15	7	5.6
Boston	125	115	181	29.87	30.00	+ .05	70.0	+ 3.7	93	6	80	52	7	60	36	61	55	63	2.86	— 0.2	13	7,551	sw.	33	sw.		24	11	14	5	4.5
Nantucket	14	43	54	30.01	30.02	+ .03	64.4	+ 3.2	78	6	70	50	7	58	24	59	57	81	2.08	— 0.7	10	7,172	sw.	43	ne.		29	4	12	14	6.7
Woods Hole	22	11	57	30.00	30.02	+ .07	65.8	+ 3.4	79	6	72	52	8	59	21	60	58	79	3.35	+ 0.8	7	9,227	sw.	42	sw.		28	9	17	4	5.1
Vineyard Haven	.....	30	55	.....	.....	.....	68.4	+ 2.4	86	6	77	54	8	60	29	.....	.....	.....	4.51	+ 2.2	6	5,869	sw.	24	sw.		5	4	22	4	5.5
Block Island	37	11	48	30.00	30.02	+ .04	64.8	+ 2.8	83	6	72	53	8	58	26	61	58	83	2.48	— 0.1	8	8,494	sw.	45	ne.		29	16	12	2	3.1
Narragansett	.....	10	.....	.....	.....	.....	66.9	+ 2.3	92	6	75	49	12	58	29	.....	.....	.....	1.50	— 1.1	6	.....	s.	.....	.....		.....	22	5	3	.....
New Haven	107	118	140	29.91	30.02	+ .04	68.8	+ 1.5	95	6	79	52	11	59	36	62	58	71	2.59	— 0.4	7	5,353	sw.	32	sw.		20	11	15	4	4.1
Mid. Atlan. States.							72.7	+ 1.8										71	2.64	— 1.0											4.7
Albany	97	84	113	29.91	30.02	+ .08	71.0	+ 2.0	94	5	82	48	11	60	31	64	60	71	1.61	— 2.0	9	5,347	s.	31	nw.		20	6	17	7	5.6
Binghamton	875	79	90	.....	.....	.....	67.4	+ 1.1	92	5	79	38	11	56	36	.....	.....	.....	2.15	— 1.2	10	3,844	n.	23	sw.		23	11	12	7	5.0
New York	314	313	346	29.70	30.03	+ .05	72.2	+ 3.2	97	6	81	55	17	64	31	63	58	66	1.83	— 1.3	8	8,196	nw.	66	nw.		29	9	16	5	4.9
Harrisburg	377	94	104	.....	.....	.....	72.6	+ 2.1	95	6	82	53	11	64	27	.....	.....	.....	2.93	— 1.3	11	4,020	w.	36	ne.		29	11	8	5	4.9
Philadelphia	117	168	184	29.92	30.04	+ .05	74.9	+ 3.2	97	6	84	58	17	66	37	66	62	66	1.09	— 2.0	9	6,655	sw.	30	sw.		28	11	8	11	5.4
Atlantic City	52	68	76	29.99	30.04	+ .07	68.9	+ 2.1	95	8	75	54	17	63	25	65	62	80	1.76	— 1.6	6	6,439	sw.	30	ne.		29	10	16	4	4.4
Cape May	24	52	70	30.04	30.06	.....	68.8	+ 0.6	94	8	74	58	17	63	26	64	.....	.....	1.08	— 2.5	10	7,360	s.	35	s.		24	14	10	6	4.5
Baltimore	123	68	82	29.91	30.04	+ .06	75.2	+ 1.7	98	6	84	55	17	66	27	67	63	67	2.16	— 1.9	7	3,489	n.	20	n.		1	13	11	6	4.5
Washington	112	59	76	29.98	30.05	+ .06	74.3	+ 1.1	97	7	84	58	17	64	32	68	64	72	2.46	— 1.5	7	4,239	s.	30	sw.		1	16	8	6	3.8
Cape Henry	.....	5	34	.....	.....	.....	75.4	+ 2.3	96	8	83	61	4	68	26	.....	.....	.....	4.30	+ 0.4	9	8,441	sw.	65	nw.		29	13	10	7	4.6
Lynchburg	685	83	88	29.32	30.04	+ .04	75.0	+ 0.8	96	7	85	55	17	65	29	68	64	71	4.84	+ 1.4	10	2,154	ne.	20	sw.		10	15	11	4	4.0
Norfolk	92	102	111	29.96	30.06	+ .06	76.2	+ 1.1	99	8	85	61	17	68	26	70	67	77	5.67	+ 1.4	7	5,982	ne.	40	nw.		9	15	9	6	4.3
Richmond	144	98	105	.....	.....	.....	76.8	.....											2.51	.....	8	4,471	n.	36	nw.		29	11	10	9	4.9
S. Atlantic States.							78.6	+ 1.5										75	3.36	— 1.3											4.2
Charlotte	773	68	76	29.26	30.05	+ .05	78.2	+ 2.4	99	8	89	55	18	67	32	68	63	65	1.68	— 2.9	5	4,330	ne.	22	ne.		29	13	9	8	4.6
Hatteras	11	17	36	30.05	30.06	+ .06	76.4	+ 2.4	88	15	81	63	18	72	12	72	70	82	1.26	— 3.3	9	8,910	sw.	36	nw.		29	15	10	5	4.2
Kittyhawk	9	12	30	.....	.....	.....	75.3	+ 1.1	97	8	83	58	*	67	28	.....	.....	.....	5.27	+ 0.7	10	9,714	.....	.....	.....		.....	18	7	5	4.1
Raleigh	375	93	101	29.68	30.06	+ .06	77.1	+ 1.4	98	8	87	57	19	67	30	69	66	73	4.42	— 1.0	10	3,796	sw.	27	ne.		9	12	13	5	4.6
Wilmington	78	82	90	30.00	30.08	+ .08	77.3	+ 0.6	95	14	85	57	18	70	33	71	69	80	4.95	— 0.8	11	5,532	sw.	36	w.		2	12	13	5	4.4
Charleston	48	14	92	30.06	30.11	+ .10	80.0	+ 0.9	98	15	86	60	18	74	21	72	69	75	3.29	— 2.4	10	7,990	sw.	36	ne.		21	11	17	2	4.0
Columbia	.....	5	.....	.....	.....	.....	81.0	+ 2.9	103	10	93	55	*	69	33	.....	.....	.....	2.56	— 1.6	9	.....	sw.	.....	.....		.....	22	13	13	4	4.1
Augusta	180	89	103	29.86	30.05	+ .07	80.6	+ 1.8	99	15	91	56	17	70	30	71	66	66	4.57	0.0	6	4,152	s.	28	nw.		28	15	12	3	3.9
Savannah	82	63	89	29.99	30.07	+ .06	80.4	+ 1.1	99	15	89	58	18	72	29	73	70	77	1.07	— 5.5	7	6,016	s.	30	nw.		28	15	13	2	3.9
Jacksonville	43	69	84	30.02	30.07	+ .07	80.1	0.0	97	15	89	60	20	71	27	74	72	83	4.52	— 0.9	7	4,916	se.	30	sw.		2	12	15	3	4.4
Florida Peninsula.							80.4	— 0.1										78	6.03	0.0											4.9
Jupiter	28	13	30	30.03	30.06	+ .06	79.8	— 0.8	90	18	86	69	21	74	20	74	72	79	3.45	— 3.2	12	6,927	sc.	33	w.		18	18	8	4	3.6
Key West	22	43	50	30.02	30.04	+ .05	81.7	— 0.8	93	13	89	70	22	78	14	75	73	76	2.47	— 1.5	12	6,186	e.	36	nw.		18	9	17	4	5.0
Tampa	36	60	67	30.01	30.05	+ .05	79.6	— 0.4	93	13	89	65	19	70	22	73	70	79	12.18	+ 4.6	16	4,164	se.	32	se.		26	4	21	5	6.2
East Gulf States.							80.0	+ 1.1										72	4.29	0.0											4.1
Atlanta	1,131	92	126	28.92	30.07	+ .05	79.6	+ 3.9	97	22	88	56	18	71	24	69	64	64	1.46	— 2.5	6	5,186	nw.	36	w.		29	15	9	6	4.6
Macon	.....	.....	.....	.....	.....	.....	80.2	.....	99	21	91	57	18	69	33	.....	.....	.....	1.61	.....	8	4,047	s.	20	s.		12	6	23	1	4.4
Pensacola	56	78	90	.....	.....	.....	81.5	+ 2.1	98	16	87	64	19	72	25	74	71	79	5.04	— 0.3	11	6,156	sw.	36	se.		11	18	8	4	3.9
Mobile	57	88	96	30.00	30.06	+ .06	79.4	— 0.3	99	22	87	64	19	72	31	70	66	66	5.77	— 0.1	6	4,875	s.	29	n.		4	18	10	2	3.1
Montgomery	221	100	112	29.82	30.05	+ .05	81.8	+ 2.4	101	21	92	59	18	72	31	.....	.....	.....	1.85	— 2.8	6	4,053	sw.	34	n.		29	17	8	5	3.9
Meridian	375	84	94	.....	.....	.....	78.3	+ 0.7	97	22	89	54	19	68	34	.....	.....	.....	2.59	— 2.3	10	3,128	sw.	25	se.		5	11	10	9	5.1
Vicksburg	247	65	73	29.76	30.02	+ .03	79.2	0.0	95	15	88	60	18	70	25	72	69	76	5.51	+ 1.2	11	3,730	se.	29	se.		5	13	14	3	3.8
New Orleans	54	112	120	29.98	30.04	+ .08	79.8	— 0.5	94	16	87	68	18	73	20	73	70	75	7.80	+ 1.2	13	5,330	se.	29	se.		5	12	15	3	4.0
Port Eads	.....	27	...	.....	.....	.....	80.4	+ 0.5	90	16	85	70	25	76	13	.....	.....	.....	9.10	.....	8	.....	se.	.....	.....		.....	8	13	9	.....
West Gulf States.							79.3	+ 0.3										76	4.19	+ 0.3											5.0
Shreveport	249	77	84	29.75	30 01	+ .05	80.2	+ 0.3	95	5	90	61	18	70	29	71	67	71	1.13	— 2.7	9	4,469	se.	29	e.		27	9	9	12	5.5
Fort Smith	481	63	72	29.48	29.98	+ .06	78.2	+ 2.1	93	24	87	59	18	69	26	71	68	75	5.51	+ 1.2	9	4,277	e.	27	n.		28	9	8	13	5.4
Little Rock	357	93	100	29.67	30.04	+ .09	77.4	+ 0.4	92	20	86	57	18	68	29	70	67	74	1.00	— 3.3	8	4,940	s.	30	nw.		28	14	12	4	4.1
Corpus Christi	20	42	50	29.91	29.93	— .01	80.4	+ 0.5	92	27	84	71	17	76	16	76	75	84	4.07	+ 1.4	9	10,795	se.	32	s.		13	7	16	7	5.0
Fort Worth	670	106	114	.....	.....	.....	79.2	.....	96	24	88	64	*	70	26	.....	.....	.....	2.78	.....	8	7,915	s.	32	s.		2	11	13	6	4.7
Galveston	54	85	96	29.91	29.96	+ .01	80.6	— 1.0	89	23	84	71	30	77	13	75	72	79	4.61	— 0.3	8	8,321	se.	36	se.		27	8	10	12	5.8
Palestine	510	54	61	29.44	29.97	+ .02	79.0	+ 0.8	94	24	88	61	18	70	29	71	68	75	4.32	+ 1.6	8	7,089	se.	45	se.		2	9	11	10	5.3
San Antonio	704	95	104	29.20	29.92	+ .01	79.6	— 1.1	96	26	88	64	19	71	26	71	68	73	8.66	+ 4.4	11	5,310	se.	26	s.		2	9	12	12	4.6
Ohio Val. & Tenn.							75.5	+ 1.5										69	2.73	— 1.5											4.2
Chattanooga	702	106	112	29.28	30 07	+ .06	77.9	+ 2.7	96	8	88	55	18	68	30	69	64	66	2.40	— 2.1	8	4,123	sw.	38	nw.		15	13	11	6	4.7
Knoxville	1,004	10	88	29.04	30.07	+ .06	76.2	+ 2.6	94	4	86	52	18	66	30	68	65	74	3.71	— 0.4	10	4,181	ne.	28	n.		15	17	9	4	3.6
Memphis	399	140	154	29.63	30.05	+ .09	79.0	+ 0.9	94	22	87	62	18	71	24	70	66	69	2.66	— 2.0	6	4,697	sw.	36	sw.		23	10	12	8	4.6
Nashville	545	128	134	29.50	30.06	+ .09	78.6	+ 2.0	98	23	89	53	18	69	32	69	64	64	0.75	— 3.6	4	4,253	w.	35	w.		28	12	11	7	4.5
Lexington	990	75	102	.....	.....	.....	74.6	+ 0.8	95	23	84	51	18	65	27	.....	.....	.....	2.55	— 1.7	9	6,050	sw.	45	w.		1	17	7	6	3.7
Louisville	525	114	136	29.50	30.06	+ .09	76.9	+ 1.8	96	5	87	56	17	67	27	67	63	67	3.80	— 0.5	10	5,232	sw.	47	w.		14	14	6	10	4.7
Evansville	434	72	82	.....	.....	.....	77.2	.....	95	21	86	56	17	69	24	.....	.....	.....	3.76	.....	9	4,715	s.	28	w.		8	17	9	4	3.5
Indianapolis	823	154	164	29.20	30.05	+ .08	73.8	+ 1.3	93	5	84	53	16	66	27	66	61	66	1.76	— 2.9	9	7,144	s.	37	w.		28	15	10	5	4.3
Cincinnati	628	152	157	29.40	30.06	+ .09	74.8	+ 1.0	96	22	84	51	16	64	29	66	61	64	3.27	— 1.1	11	4,945	sw.	35	sw.		1	15	12	3	3.6
Columbus	834	87	100	29.19	30.05	+ .09	73.4	+ 2.1	96	22	84	49	17	63	33	64	60	68	1.26	— 2.2	8	5,430	sw.	33	sw.		1	18	5	7	3.9
Pittsburg	842	116	128	29.17	30.05	+ .07	72.2	+ 0.6	93	5	82	47	17	62	30	68	66	83	3.72	+ 0.2	11	3,491	n.	24	sw.		24	13	15	2	3.5
Parkersburg	638	77	84	29.41	30.07	+ .07	73.6	+ 0.9	95	5	84	49	17	63	31	66	63	72	4.16	0.0	10	3,190	s.	40	w.		20	18	8	4	3.7
Elkins	1,940	41	51	.....	.....	.....	67.6	.....		89	5	79	42	17	56	37	.....	.....	5.98	.....	13	2,477	n.	33	w.		1	6	13	11	5.8
Lower Lake Region.							68.3	+ 1.2										67	1.79	— 1.3											3.3
Buffalo	768	178	206	29.22	30.03	+ .08	66.4	+ 1.4	83	22	73	51	16	60	27	62	58	74	0.69	— 2.8	6	8,558	w.	35	sw.		7	11	13	6	5.0
Oswego	335	76	87	29.65	30.01	+ .05	64.4	+ 0.4	87	18	73	47	3	56	29	58	54	70	1.95	— 1.4	10	5,819	sw.	24	w.		16	12	14	4	4.2
Rochester	523	81	90	29.47	30.02	+ .07	68.4	+ 2.0	91	5	79	46	11	58	35	60	54	62	1.95	— 1.3	7	5,268	sw.	27	sw.		20	22	7	1	2.8
Erie	714	92	102	29.30	30.04	+ .09	68.2	+ 1.2	89	5	76	48	17	60	31	63	60	73	1.91	— 2.0	6	6,574	sw.	40	w.		7	17	11	2	4.0
Cleveland	762	190	201	29.25	30.04	+ .07	68.6	+ 0.8	92	5	77	50	11	60	33	62	57	66	1.49	— 2.3	9	8,918	n.	48	sw.		1	17	12	1	3.2
Sandusky	629	62	74	29.38	30.04	+ .07	70.4	+ 1.4	96	22	80	51	17	61	36	63	59	68	3.46	— 0.4	12	5,528	sw.	35	w.		1	13	7	4	3.1
Toledo	628	123	127	29.38	30.04	+ .09	71.0	+ 1.2	95	22	81	46	16	61	35	62	57	62	1.03	— 2.4	8	6,236	sw.	26	w.		15	19	7	4	3.1
Detroit	730	160	166	29.27	30.03	+ .08	68.7	+ 0.8	90	22	78	49	16	60	30	61	56	64	1.82	— 1.9	9	6,732	sw.	41	sw.		7	17	10	3	3.2
Upper Lake Region.							63.3	+ 0.9										73	3.92	+ 0.2											5.0
Alpena	609	61	65	29.36	30 01	+ .07	61.6	+ 1.3	91	4	71	44	2	52	41	57	53	75	6.22	+ 2.5	11	6,541	nw.	37	se.		28	12	10	8	5.1
Escanaba	612	43	57	29.34	29.99	+ .07	59.9	— 0.6	80	23	68	38	2	52	31	56	53	79	3.98	+ 0.1	15	6,464	s.	30	ne.		28	4	16	10	6.0
Grand Haven	628	55	64	29.34	30.01	+ .07	65.4	+ 1.0	84	3	76	46	2	55	30	60	55	69	1.04	— 2.8	6	6,868	sw.	30	sw.		4	11	17	2	4.2
Marquette	734	67	95	29.17	29.94	.00	60.6	+ 0.7	91	4	70	40	2	51	47	56	51	73	4.69	+ 1.2	12	6,770	nw.	45	se.		13	6	12	12	6.3
Port Huron	639	70	108	29.37	30.05	+ .10	66.6	+ 2.5	97	6	77	43	3	56	34	60	56	69	2.15	— 1.3	8	7,292	s.	49	sw.		5	16	12	2	3.6
Sault Ste. Marie	624	58	65	29.32	29.98	+ .05	58.3	— 1.9	83	27	69	38	2	47	35	54	52	82	2.14	+ 1.0	13	6,031	w.	38	nw.		3	11	12	7	5.0
Chicago	824	241	274	29.16	30.02	+ .08	69.9	+ 3.2	90	19	78	49	2	62	31	63	60	73	2.71	— 1.1	8	11,600	sw.	48	ne.		28	15	11	4	3.7
Milwaukee	681	124	142	29.30	30.01	+ .06	66.8	+ 3.5	91	6	76	46	2	57	27	60	55	67	2.29	— 1.8	9	7,090	sw.	40	sw.		6	6	13	11	5.7
Green Bay	617	49	57	29.33	29.98	+ .03	66.0	— 0.7	88	4	76	44	2	56	29	60	56	70	4.85	+ 1.6	11	5,644	s.	39	sw.		4	9	16	5	4.6
Duluth	702	95	106	29.20	29.95	+ .03	58.1	+ 0.3	82	19	67	39	14	49	37	52	48	73	7.10	+ 2.5	18	7,110	ne.	36	ne.		14	10	9	11	5.4
North Dakota.							62.9	— 1.1										72	4.14	+ 0.3											4.4
Moorhead	935	54	60	28.90	29.89	+ .02	64.4	— 0.4	87	17	75	44	15	54	35	58	54	71	3.12	— 1.2	11	7,600	se.	40	se.		29	15	6	9	4.5
Bismarck	1,674	16	29	28.13	29.86	.00	63.6	— 0.2	91	29	74	43	8	53	33	59	55	75	5.57	+ 2.0	10	7,061	nw.	52	nw.		30	12	13	5	4.7
Williston	1,872	15	31	27.89	29.84	.00	60.6	— 2.7	87	28	72	40	15	49	41	54	49	70	3.72	+ 0.2	14	7,996	nw.	52	nw.		6	16	11	3	4.1

TABLE I.—*Climatological data for Weather Bureau Stations, June, 1899*—Continued.

Stations.	Elevation of instruments: Barometer above sea level, feet.	Elevation of instruments: Thermometers above ground.	Elevation of instruments: Anemometer above ground.	Pressure, in inches: Mean actual, 8 a. m. and 8 p. m. + 2.	Pressure, in inches: Mean reduced.	Pressure, in inches: Departure from normal.	Temperature of the air, in degrees Fahrenheit: Mean max. and min. + 2.	Temperature: Departure from normal.	Temperature: Maximum.	Temperature: Date.	Temperature: Mean maximum.	Temperature: Minimum.	Temperature: Date.	Temperature: Mean minimum.	Temperature: Greatest daily range.	Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches: Total.	Precipitation: Departure from normal.	Precipitation: Days with .01, or more.	Wind: Total movement, miles.	Wind: Prevailing direction.	Wind: Maximum velocity: Miles per hour.	Wind: Maximum velocity: Direction.	Wind: Maximum velocity: Date.	Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Total snowfall.
Upper Miss. Valley.							72.3	+ 1.1										70	4.78	+ 0.2									4.6	
Minneapolis	.....	99	208	.....	.....	.....	67.6	— 1.2	86	19	76	47	15	59	23	....	....	....	6.03	+ 2.2	14	7,266	s.	37	sw.	21	3	19	8	....	
St. Paul	837	114	124	29.05	29.93	+ .01	67.3	+ 0.1	86	19	75	48	15	59	23	60	56	70	7.23	+ 2.9	13	5,474	se.	48	nw.	12	9	14	7	5.2	
La Crosse	720	70	78	.....	.....	.....	68.8	— 0.1	90	19	77	50	16	60	25	....	....	....	11.56	+ 7.1	15	5,039	se.	42	w.	12	8	12	10	5.8	
Davenport	606	71	79	29.35	29.99	+ .05	72.4	+ 1.5	91	19	82	52	16	63	28	65	60	68	4.02	— 0.4	9	5,576	sw.	36	nw.	2	10	14	6	4.8	
Des Moines	867	84	88	29.07	29.98	+ .07	72.0	+ 1.9	90	19	81	54	10	63	26	64	60	69	3.53	— 1.8	10	6,701	sw.	40	sw.	4	6	18	6	5.6	
Dubuque	698	101	109	29.25	29.98	+ .05	70.6	+ 1.1	91	19	80	49	16	61	26	63	58	66	4.08	— 1.1	9	5,558	se.	32	ne.	2	12	15	3	4.1	
Keokuk	614	64	78	29.36	30.00	+ .07	74.0	+ 1.5	90	6	83	55	16	65	26	66	62	70	2.78	— 1.8	7	5,672	s.	30	w.	22	15	11	4	3.7	
Cairo	359	87	93	29.67	30.04	+ .09	76.6	+ 1.2	93	5	85	58	17	68	25	70	68	77	5.74	+ 1.3	9	5,140	sw.	35	w.	23	11	13	6	4.5	
Springfield, Ill.	644	82	92	29.35	30.02	+ .07	73.8	+ 1.6	92	21	83	52	16	64	30	67	63	73	2.45	— 2.0	8	6,350	s.	24	ne.	28	9	14	7	5.0	
Hannibal	534	75	107	.....	.....	.....	74.8	+ 2.4	90	6	83	53	17	67	24	....	....	....	2.79	— 1.6	10	6,747	s.	33	w.	7	19	8	3	3.1	
St. Louis	567	111	210	29.43	30.02	+ .08	77.4	+ 2.2	94	5	86	58	17	69	26	68	63	65	2.32	— 2.8	9	6,405	s.	33	w.	1	13	13	4	4.2	
Missouri Valley.							71.6	+ 0.6										72	4.51	+ 0.1									4.7	
Columbia	783	4	84	.....	.....	.....	74.5	+ 0.1	90	20	85	52	17	64	31	....	....	....	4.95	+ 0.4	11	5,264	s.	34	s.	25	8	16	6	5.1	
Kansas City	963	78	95	28.99	29.98	+ .06	74.4	+ 1.0	92	18	83	58	17	66	27	67	63	71	3.16	— 1.8	12	6,920	se.	30	s.	21	9	10	11	5.1	
Springfield, Mo.	1,324	100	103	28.65	30.01	+ .07	73.2	+ 0.8	87	3	81	55	17	65	25	68	66	81	5.24	+ 1.0	10	6,848	se.	35	nw.	1	15	9	6	3.8	
Topeka	.....	81	....	.....	.....	.....	73.9	+ 0.7	95	19	83	56	17	64	29	....	....	....	4.21	— 1.3	12	.....	se.	....	.....	...	6	19	5	5.2	
Lincoln	1,199	74	84	28.67	29.92	+ .02	72.0	+ 0.9	98	19	82	54	15	62	30	65	61	73	8.39	+ 4.0	12	7,942	s.	45	s.	2	14	11	5	4.1	
Omaha	1,105	115	123	28.78	29.92	+ .02	72.1	+ 0.6	96	18	81	56	9	63	30	66	62	74	5.77	+ 0.1	10	6,236	se.	36	sw.	2	9	15	6	5.2	
Sioux City	1,139	96	164	.....	.....	.....	70.4	+ 0.1	94	19	81	50	9	60	31	....	....	....	4.76	+ 1.3	14	9,515	s.	57	s.	3	11	10	9	5.0	
Pierre	1,572	50	62	28.24	29.87	+ .01	68.2	0.0	102	29	80	45	5	56	39	57	50	59	3.18	— 0.2	18	7,974	se.	42	e.	2	13	14	3	4.3	
Huron	1,306	56	67	28.53	29.90	.00	66.6	— 0.1	95	17	79	44	7	54	40	59	55	71	2.91	— 0.6	16	8,264	se.	43	se.	3	14	12	4	4.2	
Yankton	1,234	52	58	.....	.....	.....	70.2	+ 1.6	93	18	80	48	9	60	32	....	....	....	2.51	— 1.8	16	6,541	s.	47	s.	3	12	12	6	4.6	
Northern Slope.							61.7	— 1.1										55	1.65	— 1.0									4.7	
Havre	2,494	46	47	27.27	29.84	— .02	59.4	— 1.9	89	25	70	37	6	49	39	51	44	61	1.82	— 1.2	10	8,360	w.	42	nw.	3	13	13	4	4.6	
Miles City	2,371	42	50	27.40	29.84	— .01	64.0	— 3.0	92	18	76	42	8	52	36	55	49	66	2.44	— 0.6	12	4,850	w.	32	w.	6	12	14	4	4.3	
Helena	4,108	88	93	25.83	29.96	+ .06	58.0	— 1.4	87	24	69	34	7	47	38	46	32	42	0.84	— 1.6	10	6,798	sw.	35	sw.	24	7	14	9	5.4	T.
Kalispell	2,964	45	51	26.89	29.95	.....	55.4	.....	83	24	66	35	8	44	39	47	39	61	1.94	.....	13	4,774	nw.	38	sw.	24	5	17	8	5.9	
Rapid City	3,251	46	50	26.55	29.84	— .03	63.8	— 0.4	95	29	75	44	5	53	37	55	47	59	2.95	— 0.9	14	3,534	w.	24	nw.	30	12	13	5	4.5	
Cheyenne	6,084	58	60	24.03	29.86	+ .02	60.1	— 0.8	93	30	74	36	14	46	42	48	32	43	0.74	— 0.8	11	7,127	nw.	46	w.	19	10	13	7	4.9	T.
Lander	5,372	28	36	24.63	29.91	+ .06	58.2	— 0.9	91	18	74	26	6	42	47	46	31	43	0.82	— 0.4	4	4,110	sw.	34	sw.	26	14	13	3	4.1	T.
North Platte	2,826	43	52	27.08	29.89	+ .02	68.4	+ 0.5	100	18	81	41	9	56	41	59	53	63	1.95	— 1.5	10	7,281	s.	48	se.	1	15	14	1	4.1	
Middle Slope.							72.0	+ 0.4										61	5.16	+ 2.0									4.2	
Denver	5,290	79	151	24.72	29.87	+ .05	66.8	+ 0.4	96	30	81	40	3	53	41	51	35	38	0.47	— 0.9	4	5,876	s.	38	s.	6	15	13	2	3.5	
Pueblo	4,682	74	81	25.26	29.84	+ .03	70.0	+ 1.7	100	18	85	43	5	55	46	53	36	38	1.27	0.0	6	5,390	nw.	42	n.	13	13	15	2	3.8	
Concordia	1,398	42	47	28.48	29.92	+ .03	73.4	+ 1.1	97	18	83	54	10	63	31	66	62	71	6.30	+ 1.9	10	6,170	s.	32	s.	3	10	15	5	5.1	
Dodge	2,504	44	52	27.35	29.88	+ .04	73.4	+ 0.8	100	19	85	55	10	62	39	64	59	70	11.17	+ 7.8	9	10,211	se.	48	s.	3	14	13	3	4.0	
Wichita	1,351	78	85	28.55	29.94	+ .08	73.3	+ 0.6	91	25	82	58	17	64	29	67	64	75	6.81	+ 1.6	12	6,757	s.	33	s.	4	13	8	9	4.7	
Oklahoma	1,218	54	62	28.70	29.95	+ .06	74.9	+ 1.5	89	25	83	61	4	67	21	68	65	74	4.91	+ 1.8	9	7,896	s.	36	s.	2	16	8	6	4.0	
Southern Slope.							73.5	+ 1.9										66	4.95	+ 1.7									4.0	
Abilene	1,749	45	54	28.16	29.94	+ .05	76.6	+ 1.8	93	26	85	62	5	68	27	68	64	69	5.45	+ 2.2	7	8,021	se.	51	se.	2	12	13	5	4.2	
Amarillo	3,691	54	61	26.23	29.89	+ .02	70.4	+ 2.0	95	20	82	49	9	58	39	61	54	62	4.45	+ 1.2	10	11,859	s.	54	w.	1	15	11	4	3.9	
Southern Plateau.							77.1	— 0.8										33	0.59	+ 0.3									2.2	
El Paso	3,767	10	110	26.12	29.82	+ .04	78.0	— 2.2	98	21	91	50	3	65	37	58	41	36	0.61	+ 0.2	6	7,879	e.	45	w.	2	17	13	0	3.2	
Santa Fe	6,998	47	50	23.31	29.88	+ .02	64.0	— 1.1	84	19	76	35	3	52	30	48	27	33	1.22	+ 0.3	12	5,237	se.	34	sw.	2	17	12	1	3.0	
Flagstaff	6,885	12	25	23.38	29.96	.....	58.7	.....	86	28	76	32	2	42	47	48	.....	....	1.43	.....	7	.....	sw.	....	.....	...	9	9	12	3.3	
Phenix	1,076	47	57	28.65	29.74	— .03	84.7	+ 0.9	110	28	99	52	3	70	41	62	45	32	0.75	+ 0.7	4	3,656	e.	26	s.	24	23	6	1	2.1	
Yuma	139	16	50	29.58	29.72	— .03	84.6	— 0.3	112	17	100	55	3	69	43	64	50	39	T.	0.0	0	5,248	sw.	32	w.	2	29	0	1	0.4	
Independence	3,907	10	58	25.90	29.74	— .04	74.2	— 1.2	96	17	58	46	2	61	33	54	32	27	0.37	+ 0.3	3	6,664	nw.	39	se.	24	26	3	1	1.1	
Middle Plateau.							63.0	— 0.4										33	0.57	— 0.1									2.0	
Carson City	4,730	82	92	25.36	29.92	+ .04	62.6	+ 1.8	91	17	78	34	1	47	44	47	31	36	0.07	— 0.4	1	5,063	w.	36	sw.	24	22	7	1	1.8	
Winnemucca	4,340	59	70	25.65	29.94	+ .08	61.3	— 1.1	93	17	77	35	*	46	47	46	27	36	0.67	— 0.1	3	6,839	sw.	36	nw.	19	17	10	3	2.9	
Salt Lake City	4,344	83	90	25.60	29.90	+ .04	65.1	— 1.8	96	29	78	34	6	53	38	49	30	30	0.96	+ 0.2	4	4,664	se.	41	n.	5	19	8	3	2.6	
Grand Junction	4,608	43	50	25.33	29.84	.....	70.0	.....	98	30	84	45	7	56	38	51	30	31	1.74	.....	8	4,414	e.	35	se.	25	18	8	4	3.2	
Northern Plateau.							61.3	— 1.2										52	0.58	— 0.8									4.3	
Baker City	3,470	49	55	26.44	29.98	+ .04	57.2	+ 0.5	90	16	70	31	6	44	41	46	35	52	0.51	— 1.0	6	4,199	s.	26	n.	5	15	11	4	4.0	T.
Boise	2,736	61	68	27.13	29.93	+ .04	63.6	— 2.1	98	16	78	34	6	49	44	53	44	56	0.57	— 0.2	5	3,753	w.	25	sw.	28	17	10	3	3.3	
Idaho Falls‡	4,742	10	56	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Spokane	1,943	99	107	27.94	29.96	+ .04	60.4	— 1.6	86	24	72	42	7	49	35	49	38	50	0.56	— 1.1	9	5,325	sw.	29	sw.	26	5	14	11	6.3	
Walla Walla	1,018	65	73	28.93	30.00	+ .07	63.9	— 1.7	90	17	76	42	6	52	34	52	42	50	0.66	— 0.7	6	4,827	s.	30	sw.	4	15	15	0	3.7	
N. Pac. Coast Reg.							55.2	— 2.6										74	1.46	— 0.9									6.0	
Fort Canby	179	10	34	29.96	30.16	+ .16	52.9	— 2.6	62	*	57	45	7	48	16	49	47	86	2.26	— 0.4	16	7,348	n.	40	s.	4	7	7	16	6.9	
Neah	50	7	24	30.08	30.14	+ .12	51.6	— 4.4	68	8	56	40	22	47	15	49	46	83	2.17	— 2.7	11	6,083	w.	44	w.	5	2	3	25	8.4	
Port Crescent	256	15	20	.....	.....	.....	50.6	— 3.1	70	18	57	35	6	44	33	....	....	....	0.67	— 0.9	7	4,293	w.	24	w.	4	6	18	6	5.6	
Seattle	119	114	121	29.98	30.11	+ .08	57.6	— 1.8	76	15	66	42	5	50	28	51	45	69	1.26	0.0	11	3,966	s.	23	se.	10	5	15	10	6.1	
Tacoma	213	113	120	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Astoria	.....	18	....	.....	.....	.....	55.3	— 2.3	75	19	62	42	7	48	26	....	....	....	2.60	— 0.5	10	.....	w.	....	.....	...	10	6	14	....	
Portland, Oreg	153	208	213	29.94	30.10	+ .05	58.8	— 2.8	81	22	67	39	6	50	30	52	46	67	0.62	— 1.2	6	5,648	nw.	33	s.	1	10	11	9	5.2	
Roseburg	521	56	67	29.50	30.06	+ .01	59.5	— 1.5	88	16	72	36	6	47	40	51	44	65	0.62	— 0.7	4	3,226	ne.	22	nw.	30	17	6	7	3.6	
Mid. Pac. C'st Reg.							62.0	+ 0.1										60	0.47	— 0.1									2.0	
Eureka	64	60	69	30.03	30.09	+ .06	52.0	— 2.7	61	28	56	40	6	48	14	49	47	84	0.75	— 0.6	3	6,156	nw.	38	nw.	5	16	11	3	3.0	
Mount Tamalpais	2,375	11	18	27.51	29.93	.....	66.8	.....	86	15	74	41	1	60	25	53	39	43	0.29	.....	3	14,257	nw.	86	nw.	11	24	5	1	1.8	
Red Bluff	334	54	58	29.52	29.86	— .02	77.9	+ 3.3	107	17	92	51	1	64	38	58	42	36	0.94	+ 0.4	2	5,718	n.	34	n.	6	27	1	2	1.2	
Sacramento	71	106	117	29.79	29.86	— .03	71.2	+ 2.6	98	16	86	47	2	57	39	58	48	52	0.49	+ 0.3	2	6,341	sw.	28	n.	6	25	3	2	1.9	
San Francisco	153	161	167	29.78	29.94	.00	56.9	— 1.5	75	27	63	47	17	50	23	52	49	83	0.01	— 0.2	1	10,193	w.	44	w.	23	23	5	2	2.0	
Point Reyes Light	.....	12	16	.....	.....	.....	51.9	— 1.1	65	16	57	45	*	47	20	....	....	...	0.18	— 0.2	1	15,644	nw.	72	nw.	13	15	0	15	....	
S. Pac. Coast Reg.							66.8	+ 0.2										69	0.61	+ 0.5									3.4	
Fresno	332	67	70	29.49	29.83	— .03	78.3	+ 4.3	109	16	95	46	2	62	41	59	44	39	0.66	+ 0.6	2	4,969	nw.	24	nw.	11	26	3	1	1.3	
Los Angeles	330	74	82	29.55	29.90	— .01	65.1	— 0.6	89	29	74	50	2	56	32	58	55	81	0.58	+ 0.5	2	3,222	sw.	25	sw.	25	7	20	3	4.4	
San Diego	87	94	102	29.80	29.90	— .02	61.4	— 2.7	70	28	65	55	15	58	12	57	55	81	0.27	+ 0.2	2	4,645	nw.	34	sw.	1	17	5	8	4.5	
San Luis Obispo	201	10	46	29.73	29.95	+ .02	62.4	0.0	90	21	75	42	2	50	40	55	51	74	0.92	+ 0.8	1	3,423	w.	30	w.	1	19	8	3	3.4	
West Indies.																														
Basseterre	29	41	54	30.00	30.03	.....	79.7	.....	87	12	85	71	6	74	15	74	72	76	3.57	.....	24	7,193	e.	25	e.	10	2	22	6	6.0	
Bridgetown	30	57	65	29.95	29.98	.....	80.1	.....	89	20	86	71	30	74	18	75	72	77	4.32	.....	18	6,870	e.	28	e.	10	2	19	9	6.5	
Cienfuegos	53	62	67	29.96	30.01	.....	79.4	.....	92	12	88	67	5	71	21	74	72	81	7.01	.....	18	4,659	ne.	29	ne	2	14	14	2	4.0	
Havana	57	83	101	29.96	30.02	.....	79.2	.....	90	11	86	68	18	72	18	74	71	80	2.79	.....	12	6,145	e.	40	ne.	12	4	17	9	5.9	
Kingston	286	38	52	29.67	29.97	.....	80.0	.....	93	30	89	69	10	71	22	72	69	74	0.84	.....	8	5,372	ne.	29	se.	1	3	13	14	6.5	
Port of Spain	40	65	66	29.91	29.95	.....	79.4	.....	90	6	87	69	23	72	20	74	72	79	7.44	.....	16	3,344	e.	17	e.	15	6	15	9	6.2	
Roseau	25	38	47	29.97	29.99	.....	80.4	.....	91	18	88	71	*	73	18	73	70	73	5.56	.....	23	3,709	ne.	28	e.	29	6	16	8	5.6	
San Juan	82	48	56	29.95	30.03	.....	79.3	.....	91	22	85	71	6	74	17	75	73	82	7.23	+ 2.4	27	4,838	e.	24	e.	27	7	17	6	5.3	
Santiago de Cuba	82	45	51	29.90	29.98	.....	81.1	.....	98	22	89	70	6	73	19	73	71	75	2.20	.....	11	3,200	ne.	28	ne.	5	2	19	9	6.3	
Santo Domingo	59	82	88	29.98	30.04	.....	78.4	.....	90	27	86	67	14	71	20	74	72	85	6.31	.....	16	2,987	n.	18	e.	27	4	19	7	5.7	
Willemstad	75	39	46	29.85	29.92	.....	81.3	.....	87	26	86	74	30	77	13	75	72	77	0.40	.....	8	9,679	e.	25	e.	12	8	13	9	5.2	

NOTE.—The data at stations having no departures are not used in computing the district averages. Letters of the alphabet denote miumber of days missing from the record. *Two or more dates. † Received too late to be considered in departures, etc. ‡ Station closed June 15, 1899.

TABLE II.—*Climatological record of voluntary and other cooperating observers, June, 1899.*

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Alabama.	°	°	°	*Ins.*	*Ins.*
Alco	98	53	78.2	8.23	
Ashville	101	51	78.8	2.46	
Bermuda	.....	57	.....	2.32	
Birmingham	100	56	80.0	2.59	
Bridgeport	....	.....	.....	2.99	
Citronelle	97	65	80.4	5.06	
Clanton	97	58	80.1	1.69	
Daphne	97	62	80.2	9.50	
Decatur	104	52	81.2	2.22	
Demopolis	.....	.....	.....	2.58	
Elba[c]	101	51	78.6	2.31	
Eufaula[a]	101	57	82.3	0.64	
Evergreen	98	57	78.1	4.20	
Florence[a]	.....	.....	.....	2.20	
Florence[b]	100	54	79.5	1.85	
Fort Deposit	101	58	80.9	1.76	
Gadsden	102	50	78.6	1.49	
Goodwater	103	52	80.0	2.27	
Greensboro	99	59	79.8	2.39	
Hamilton	103	54	79.4	2.09	
Healing Springs	99	52	77.9	3.66	
Highland Home	98	63	80.2	4.05	
Jasper	98	60	78.5	2.16	
Livingston[a]	98	64	81.2	3.06	
Lock No. 4	101	52	78.6	1.38	
Madison Station	102	52	79.4	1.99	
Mapiegrove [1]	101	51	77.1	2.61	
Marion	101	60	81.3	2.85	
Mount Willing	102	60	83.1	2.35	
Newbern	101	58	81.4	1.35	
Newburg	105	54	80.9	1.62	
Newton	98	65	77.9	3.63	
Oneonta	97	49	76.2	2.29	
Opelika	100	57	80.8	2.47	
Oxanna	99	64	80.2	2.05	
Pineapple	103	52	81.0	2.54	
Pushmataha	99	57	79.8	3.45	
Riverton	102[2]	58[1]	80 1[4]	1.18	
Rockmills	101	54	79.4	1.92	
Scottsboro	97	52	78.1	4.04	
Selma	105	58	81.8	1.82	
Talladega	101	50	79.3	1.53	
Tallassee	....	.....	.....	2.15	
Thomasville	99	56	81.0	1.56	
Tuscaloosa	101	55	80.2	2.99	
Tuscumbia	99	55	80.8	1.71	
Union	100	.....	.....	3.97	
Union Springs	103	59	82.2	3.43	
Uniontown	101	63	82.2	4.90	
Valleyhead	97	56	77.1	2.74	
Warrior	.....	.....	.....	2.51	
Wetumpka	104	55	83.0	2.75	
Wilson *[1]	104	69	80.7	7.11	
Alaska.					
Sitka	62	33	48.4	4.99	
Skaguay	80	34	54.4	1.29	
Arizona.					
Allaire Ranch	.....	.....	.....	0.25	
Aztec *[1]	120	60	90.1	T	
Benson	.....	.....	.....	0.80	
Bisbee	94	38	72.2	0.25	T.
Blaisdell *[1]	115	58	89.7	T.	
Bowie *[1]	102	60	76.6	0.00	
Buckeye	108	50	81.8	0.00	
Camp Creek	101	47	77.2	0.56	
Casa Grande *[1]	105	60	87.0	0.75	
Champie Camp	112	49	84.6	1.00	
Cochise *[1]	101	42	74.2	1.12	
Congress	103	48	81.2	0.38	
Dragoon	.....	.....	.....	0.00	
Dragoon Summit *[1]	95	55	78.8	0.35	
Dudleyville	107	45	78.2	1.96	
Fort Apache	94	35	69.2	1.90	
Fort Defiance	91	32	63.0	0.37	T.
Fort Grant	93	31	68.3	0.46	
Fort Huachuca	96	37	73.8	1.30	
Fort Mohave	118	55	89.4	0.24	
Gilabend *[1]	113	60	85.2	T.	
Holbrook	104	36	72.4	0.30	
Hot Springs	112	53	85.2	0.90	
Ingleside	112	49	84.8	0.49	
Jerome	98	40	75.7	0.20	
Lochiel *[1]	93	58	72.5	1.47	
Maricopa *[1]	112	64	91.7	1.81	
Mesa	110	46	82.4	0.68	
Mount Huachuca	100	37	73.8	1.03	
Music Mountain	111	48	81.4	0.61	
Natural Bridge	.....	.....	.....	1.73	
Oracle	96	40	74.5	1.99	
Oro	.....	.....	.....	0.72	
Oro Blanco	99	33	76.4	2.23	
Pantano *[1]	98	53	76.4	2.52	
Parker	120	54	86.8	T.	
Peoria	111	52	84.8	0.72	
Phenix	117	46	85.2	1.10	
Pima	104	38	77.4	1.28	
Pinal Ranch	.....	.....	.....	2.13	
Prescott	97	25	67.0	1.65	
San Carlos	110	43	79.9	0.90	
San Simon *[1]	97	44	75.4	.....	
Sentinel *[1]	116	62	89.6	0.00	
Signal	117	51	84.5	T.	
Snowflake	96	33	65.7	0.98	
Strawberry	96	33	64.7	1.13	2.5
Texas Hill *[1]	120	62	91.4	0.03	
Tombstone	98	41	75.0	0.65	
Tonto	104	44	78.2	0.80	
Tuba	102	43	75.2	0.49	
Tucson	106	48	80.9	1.27	
Vail *[5]	101	55	84.4	0.08	
Walnut Grove	.....	.....	.....	0.12	
White Hills	110	54	85.0	0.32	
Winslow	98	36	70.6	0.75	
Yarnell	.....	.....	.....	0.95	
Arkansas.					
Amity	88	61	77.4	5.75	
Arkansas City	.....	.....	.....	2.60	
Beebranch	93	52	76.6	1.85	
Blanchard Springs	97	53	76.6	4.38	
Brinkley	96	51	74.4	1.05	
Camden[a]	.....	.....	.....	1.80	
Camden[b]	100	62	79.4	1.80	
Canton *[1]	94	56	76.4	1.82	
Conway	.....	54	.....	2.85	
Corning	94	51	76.2	3.79	
Dallas	92	56	78.3	3.30	
Dardanelle	.....	.....	.....	1.40	
Fayetteville	89	51	74.2	3.59	
Forrest	98	52	78.6	1.67	
Fulton	.....	.....	.....	1.73	
Hardy	.....	53	.....	1.50	
Helena[a]	.....	.....	.....	1.84	
Helena[b]	99	56	79.5	2.12	
Hot Springs[a]	93	53	77.1	4.02	
Hot Springs[b]	.....	.....	.....	3.36	
Jonesboro	.....	58	.....	3.53	
Keesees Ferry	94	51	74.9	2.73	
Lacrosse	.....	53	.....	2.83	
Lonoke	96	53	78.4	0.77	
Luna Landing *[6]	92	69	78.2	0.20	
Malvern	92	53	77.0	2.54	
Marianna	99	52	79.4	2.31	
Marvell	99	54	79.2	0.87	
Moore	.....	.....	.....	4.40	
Mossville	84	58	71.2	4.67	
Mount Nebo	88	54	73.2	1.32	
Nashville	94	58	78.7	3.95	
New Gascony	95	56	79.4	1.80	
Newport[a]	.....	.....	.....	2.46	
Newport[b]	96	55	78.6	2.64	
Newport[c]	96	52	79.7	2.96	
Oregon	91	51	74.2	2.09	
Osceola	96	59	79.0	2.39	
Ozark	95	58	78.2	2.67	
Pinebluff	99	55	79.7	2.59	
Pocahontas	91	54	75.6	4.88	
Pond	89	51	73.8	5.90	
Powell	.....	51	.....	2.14	
Prescott	94	57	78.8	0.93	
Rison	.....	54	.....	2.66	
Russellville	93	54	76.5	1.15	
Silver Springs	91	52	74.0	2.82	
Spielerville	95	52	77.7	1.89	
Stuttgart	94	55	77.6	1.36	
Texarkana	96	59	80.0	3.89	
Warren	97	55	78.2	1.96	
Washington	89	59	77.0	2.49	
Wiggs *[1]	91	56	78.2	3.20	
Winslow	81	53	71.4	5.25	
Witts Springs	0	50	73 6	4.69	
California.					
Agnew	92	40	63.0	0.00	
Anada	96	34	62.2	0.09	
Arlington Heights	102	46[c]	69.2	0.30	
Azusa	.....	.....	.....	0.91	
Ballast Point L. H	.....	.....	.....	0.25	
Bear Valley	.....	.....	.....	1.01	
Berkeley	80	48	61.2	0.05	
Bishop	98	39	69.5	0.00	
Blue Lakes City	107	43	71.6	0.40	
Boca *[1]	88	36	54.6	0.10	
Bodie	80	23	50.5	0.58	6.0
Bowmans Dam	.....	.....	.....	1.04	
Cahto	.....	.....	.....	0.00	
Caliente *[1]	104	55	79.0	0.00	
Campbell	90	40	63.0	0.03	
Cape Mendocino L. H	.....	.....	.....	0.50	
Cedarville	92	32	60.0	0.13	
Centerville *[1]	100	54	68.2	0.49	
Chico *[1]	107	57	78.2	2.27	
Cisco *[1]	80	34	54.1	2.10	
Corning *[1]	106	55	77.3	0.18	
California—Cont'd.					
Coronado	72	56	63.0	.....	
Craftonville	102	48	72.6	0.86	
Crescent City	69	36	53.0	1.30	
Crescent City L. H	.....	.....	.....	0.85	
Cuyamaca	86	30	59.7	2.96	
Delano *[1]	107	53	83.0	1.25	
Delta *[1]	98	54	72.7	4.05	
Dunnigan *[1]	107	56	78.2	0.61	
Durham *[1]	102	55	74.6	0.46	
East Brother L. H	.....	.....	.....	0.00	
Edmanton *[1]	89	38	60.2	0.64	
El Cajon	94	48	66.3	0.52	
Elsinore	112	43	71.8	0.18	
Escondido	92	43	65.8	0.96	
Fallbrook *[1]	96	49	64.7	0.90	
Folsom City *[1]	104	55	76.0	0.21	
Fordyce Dam	.....	.....	.....	1.14	7.0
Fort Ross	72	44	55.0	0.04	
Fort Tejon	.....	.....	.....	0.98	
Georgetown	93	42	68.3	1.61	
Gilroy (near)	98	42	64.8	0.07	
Goshen *[5]	105	48	81.2	0.71	
Grand Island *[5]	104	52	76.0	0.12	
Grass Valley	.....	.....	.....	0.83	
Greenville	94	32	60.2	0.14	
Healdsburg	99	42	67.0	T.	
Hollister	95	39	64.2	0.67	
Hueneme (near)	80	41	61.0	.....	
Humboldt L. H	.....	.....	.....	0.26	
Indio *[1]	114	65	93.2	0.00	
Iowa Hill *[1]	92	48	68.7	1.15	
Irvine	100	56	73.3	0.63	
Jackson	102	44	71.2	1.00	
Keene	100	44	74.0	0.79	
Kennedy Gold Mine	97	44	69.4	0.21	
King City *[1]	98	42	69.8	0.07	
Kingsburg *[5]	105	52	82.8	0.58	
Kono Tayee	94	48	71.1	0.28	
Lagrange *[5]	111	54	79.6	0.15	
Lakeside	.....	.....	.....	0.66	
Lamesa	.....	.....	.....	0.62	
Laporte *[1]	83	38	57.8	1.48	
Las Fuentes Ranch	.....	.....	.....	0.00	
Lemoncove	108	51	78.7	0.55	
Lemoore[a] *[1]	105	51	80.1	0.00	
Lick Observatory	85	35	63.7	0.39	
Lime Point L. H	.....	.....	.....	1.05	
Lodi	101	47	72.4	0.31	
Los Gatos[b]	94	41	65.0	0.01	
Malakoff Mine	93	37	66.3	0.65	
Mammoth Tank *[1]	118	60	90.1	0.00	
Manzana	109	42	77.0	0.04	
Mare Island L. H	.....	.....	.....	0.00	
Merced *[1]	107	52	77.8	0.03	
Mills College	.....	.....	.....	0.22	
Milo	.....	.....	.....	1.71	
Milton (near) *[1]	104	49	73.1	0.40	
Modesto *[1]	103	53	76.7	0.97	
Mohave *[1]	108	52	78.9	0.00	
Mokelumne Hill *[3]	.....	49	68.9	0.20	
Monterio	98	38	73.1	0.32	
Monterey *[1]	77	52	61.2	0.05	
Morena Dam	.....	.....	.....	1.15	
Napa[b]	97	43	66.3	0.47	
Needles	112	61	90.3	0.08	
Nevada City	91	40	64.2	0.91	
Newhall *[1]	105	53	69.4	0.25	
North Ontario	94	48	66.3	0.90	
North San Juan *[1]	94	44	64.0	0.40	
Oakland[a]	84	47	61.8	0.06	
Ogilby *[1]	118	60	89.6	0.00	
Oleta *[1]	96	48	68.7	0.71	
Orland *[1]	112	60	83.3	0.57	
Palermo	109	49	77.2	1.30	
Paso Robles[b]	97	41	68.0	0.13	
Peachland *[5]	88	50	66.2	0.01	
Piedras Blancas L. H	.....	.....	.....	0.00	
Pigeon Point L. H	.....	.....	.....	0.12	
Pilot Creek	.....	.....	.....	2.13	
Pine Crest	92	46	62.6	1.06	
Point Ano Nuevo L. H	.....	.....	.....	0.04	
Point Arena L. H	.....	.....	.....	0.00	
Point Bonita L. H	.....	.....	.....	0.15	
Point Conception L. H	.....	.....	.....	0.27	
Point Firmin L. H	.....	.....	.....	0.40	
Point George L. H	.....	.....	.....	0.28	
Point Hueneme L. H	.....	.....	.....	0.45	
Point Lobos	68	47	54.9	0.02	
Point Loma L. H	.....	.....	.....	0.00	
Point Montara L. H	.....	.....	.....	0.05	
Point Pinos L. H	.....	.....	.....	0.00	
Point Sur L. H	.....	.....	.....	0.22	
Pomona (near)	104	43	70.4	0.73	
Poway *[3]	92	53	62.6	0.51	
Quincy	92	37	62.4	0.13	
Ranch House	94	56	71.8	0.56	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
California—Cont'd.	°	°	°	*Ins.*	*Ins.*
Raymond	116	41	77.0	1.30	
Redding	101	51	75.8	2.46	
Redlands	102	48	70.6	0.87	
Represa	100	50	73.2	0.43	
Rio Vista	103	49	72.5	0.90	
Roe Island L. H	.....	.....	.....	0.00	
Romie	94	40	64.2	0.00	
Rosewood	109	45	75.4	0.02	
Sacramento *a*	99	46	71.2	0.18	
Salinas *1	79	50	61.4	0.00	
Salton *1	123	60	94.0	0.00	
San Bernardino	104	41	70.0	0.95	
San Leandro *1	83	54	63.3	0 21	
San Luis L. H	.....	.....	.....	0.15	
San Mateo *1	85	56	68.3	0.71	
San Miguel *1	102	46	71.1	0.17	
San Miguel Island	80	46	58.2	.....	
Santa Barbara *a*	84	47	61.4	0.78	
Santa Barbara L. H	.....	.....	.....	0.87	
Santa Clara *a*	.....	.....	.....	0.38	
Santa Cruz *b*	89	40	58.6	0.14	
Santa Cruz L. H	.....	.....	.....	0.10	
Santa Maria	87	46	62.8	0.00	
Santa Monica *1	75	57	63.4	0.00	
Santa Paula	95	50	68.2	0.59	
Santa Rosa *1	90	50	66.6	0.00	
Shasta	106	49	77.4	1.96	
Sierra Madre	95	48	66.2	1.56	
Sonoma	.....	.....	.....	0.09	
S. E. Farallone L. H	.....	.....	.....	0.00	
Stanford University	92	43	63 5	0.01	
Stockton *a*	98	46	71.0	0.20	
Summerdale	87	30	60.4	1.79	
Susanville	89	35	60.4	0.00	
Tehama *1	103	57	79.6	0.59	
Tejon Ranch	103	47	78.1	0.53	
Templeton *1	105	40	65.6	0.45	
Thermalito	111	50	77.2	0.46	
Trinidad L. H	.....	.....	.....	0.70	
Truckee *1	88	32	56.1	0.00	
Tulare *b*	.....	.....	.....	0.48	
Tulare *c*	112	50	78 4	0.45	
Ukiah	99	43	67.3	0.00	
Upperlake	102	43	69 9	0.05	
Upper Mattole *1	102	48	63.3	0.12	
Vacaville *a* *1	104	54	73.1	0.32	
Ventura	85	51	67.6	0.71	
Visalia	.....	.....	.....	0.45	
Volcano Springs *1	122	70	93.5	0.00	
Walnut Creek	105	54	76.2	0.02	
Westpoint	.....	.....	.....	0.66	
West Saticoy	.....	.....	.....	0.00	
Wheatland	105	47	74.0	0.29	
Williams *1	105	60	82.0	T.	
Wilmington *1	83	51	63.1	0.40	
Wire Bridge *5	100	54	73.3	1.30	
Yerba Buena L. H	.....	.....	.....	0.00	
Yreka	97	35	63.0	0.61	
Yuba City *5	105	58	79.2	0.43	
Colorado.					
Antlers	97	37	63.8	1.60	
Arkins	.....	.....	.....	0.92	
Boulder	95	43	65.9	0.58	
Boxelder	.....	.....	.....	1.79	
Breckenridge	74	25	46.6	1.52	7.0
Canyon	100	40	69.4	0.86	
Castlerock	98	33	63.7	1.10	
Cedaredge	96	36	63.5	1.40	
Cheyenne Wells	102	39	68.6	1.89	
Clearview *1	76	30	48.7	0.55	
Colorado Springs	91	39	63.2	1.73	
Cope	103	45	69.3	3.40	
Crook	104	35	69.0	1.43	
Delta	.....	.....	.....	1.54	
Dumont	.....	.....	.....	0.76	
Durango	93	34	63.0	1.58	
Fairview	87	30	56.8	0.80	
Fort Collins	96	36	63.7	1.03	
Fort Morgan	99	32	67.8	0.07	
Fox	.....	.....	.....	3.48	
Garnett	87	24	56.9	0.18	
Georgetown	83	34	56.2	.....	
Gilman	.....	.....	.....	1.66	
Gleneyrie	89	41	62 3	1.84	
Greeley	96	39	69.8	0.47	
Gunnison	87	27	57.6	0.60	T.
Hamps	97	35	64.2	1.13	
Hoehne	94	38	68.4	0.59	
Holyoke	.....	.....	.....	0.92	
Holyoke (near)	106	34	68.9	1.35	
Hugo	.....	.....	.....	0.40	
Lake Moraine	78	29	51.4	1.15	2.0
Lamar	106	45	74.0	1.53	
Laporte	.....	.....	.....	0.71	
Las Animas	105	43	72.1	0.52	
Leadville (near) *1	80	34	50.7	0.27	0.8
Leroy	101	36	66.6	0.28	
Longs Peak	79	25	50.3	1.09	0.2
Mancos	93	30	61.6	1.05	
Meeker	97	29	60.8	3 26	
Minneapolis	104	40	71.8	3.26	
Moraine	83	29	53.9	1.57	
Pagoda	94	25	56.0	1.82	
Parachute	98	36	65.7	2.13	
Perry Park	.....	.....	.....	0.69	
Rangely	96	32	63.6	0.70	
Rockyford	105	43	70.9	0.78	
Ruby	.....	.....	.....	2.20	22.0
Saguache	85	32	59.0	0.50	
Salida	91	30	61.8	0.12	
San Luis	87	30	57.8	0.46	
Santa Clara *1	88	42	60.8	2.48	
Seibert	.....	.....	.....	1.32	
Smoky Hill Mine	89	28	56.0	0.74	
Springfield	.....	.....	.....	0.69	
Strickler Tunnel	.....	.....	.....	0.96	6.8
Trinidad	.....	.....	.....	0.82	
Troutvale	84	18	49.6	1.00	T.
T. S. Ranch	99	40	66.6	2.13	
Vilas	.....	.....	.....	1.18	
Wagon Wheel	83	20	49.2	1.20	
Walden	87	27	52.7	0.38	0.2
Wallet	.....	.....	.....	2.50	
Westcliffe	87	33	60.1	0.77	T.
Wray	103	41	70.2	1.83	
Yuma	.....	.....	.....	3.03	
Connecticut.					
Bridgeport	99	50	70.0	3.50	
Canton	94	42	66.8	6.44	
Colchester	93	45	68.0	2.82	
Falls Village	.....	.....	.....	3.99	
Greenfield Hill	.....	.....	.....	2.84	
Hartford *a*	94	53	70.0	3.06	
Hartford *b*	.....	.....	.....	2.87	
Hawleyville	93	47	68.8	4.33	
Middletown	95	44	69.4	2.55	
New London	89	54	67.8	2 60	
North Grosvenor Dale	94	42	67.9	3.81	
Norwalk	97	47	69.0	3.06	
Southington	92	46	68.4	2.23	
South Manchester	.....	.....	.....	2.21	
Storrs	92	45	66.9	3.72	
Voluntown	95	43	67.8	2.59	
Wallingford	.....	.....	.....	2.87	
Waterbury	96	43	69.8	2.32	
West Cornwall	87	48	66.0	3.39	
West Simsbury	.....	.....	.....	6.71	
Delaware.					
Milford	97	54	75.0	1.40	
Millsboro	100	53	74.6	1.11	
Newark	97	51	72.6	2.55	
Seaford	99	53	76.0	1.49	
Wyoming	98	53	73.0	1.36	
District of Columbia.					
Distributing Reservoir *5	96	61	77.2	1.88	
Receiving Reservoir *5	94	60	75.9	1.72	
West Washington	98	51	75.2	1.91	
Florida.					
Archer	101	55	80.8	7.18	
Bartow	98	64	81.5	5.78	
Boca Raton	91	67	79.6	3.85	
Brooksville	100	63	81.9	9.05	
Carrabelle	98	64	80.8	1.80	
Clermont	101	65	82.8	5.59	
Dalkeith	99	62	81.5	.....	
De Funiak Springs	103	58	80.8	7.73	
Estero *1	93	71	79.4	.....	
Eustis	99	61	81.7	7.22	
Federal Point	98	57	78.8	5.34	
Fort Meade	98	61	79.9	.....	
Gainesville	101	59	82.7	2.43	
Grasmere	99	63	82.0	4.74	
Homeland	94	64	78.0	.....	
Huntington	98	59	79.8	8.17	
Inverness	97	61	80.0	7.97	
Jasper	100	57	81.0	5.50	
Kissimmee	98	62	79.5	3.06	
Lake Butler	100	54	80.2	4.92	
Lake City	103	55	80.8	3.06	
Maccienny	104	53	80.4	4.91	
Manatee	94	64	79.4	7.65	
Merritts Island	94	69	81.2	0.63	
Myers	93	67	79.7	5.93	
New Smyrna	92	55	77.9	2.92	
Ocala	99	56	80.4	8.68	
Orange City	100	66	83.4	4.23	
Orlando	97	66	81.6	4.15	
Plant City	99	64	80.4	11.57	
St. Andrews	101	62	81.6	1.88	
St. Francis	100	54	77.9	7.72	
St. Francis Barracks	91	61	77.8	4.80	
Sebastian	93	69	79.0	3.75	
Stephensville *1	97	58	79.0	2.93	
Switzerland *1	98	55	78.2	4.49	
Tallahassee	95	62	80.3	6.50	
Tarpon Springs	.....	.....	.....	8.29	
Wausau	100	58	81.4	5.18	
Georgia.					
Adairsville	96	54	78.8	1.86	
Alapaha	100	55	80.4	2.59	
Albany	104	60	87.8	2.57	
Allentown	103	52	85.0	1.69	
Americus	101	58	82.4	1.51	
Athens *b*	100	53	80.0	1.55	
Bainbridge	100	61	82.6	1.02	
Bellville	97	56	79.2	3.36	
Blakely	.....	.....	.....	7.84	
Camak	103	56	81.3	0.65	
Carlton	.....	.....	.....	1.10	
Clayton	95	51	74.7	3.12	
Columbus	103	68	83.2	1.75	
Covington	103	55	80.2	2.16	
Crescent	.....	.....	.....	1.82	
Dahlonega	92	50	74.0	4.12	
Diamond	93	50	73.8	3.10	
Dublin	.....	.....	.....	1.46	
Eastman	100	57	82.9	1.06	
Elberton	99	55	80.3	2.42	
Fitzgerald	99	55	81.0	2.34	
Fleming	103	51	79 8	3.22	
Fort Gaines	99	58	81.9	2.89	
Franklin	95	58	79.0	2.33	
Gainesville	94	54	76.8	3.41	
Gillsville	99	52	78.1	1.94	
Greenbush	96	52	74.2	3.58	
Griffin	102	51	78.8	0.75	
Harrison	.....	.....	.....	2.25	
Hephzibah	.....	.....	.....	4.40	
Jesup	101	49	79.8	1.51	
Lagrange	100	52	79.3	2.22	
Leverett	106	54	81.0	1.91	
Lumpkin	101	58	82.4	1.43	
Marietta	94	52	75.2	4.96	
Marshallville	99	59	82.7	0.96	
Mauzy	99	55	80.6	3.17	
Millen	105	54	82.7	3.74	
Morgan	101	58	81.7	2.59	
Newnan	102	54	80.3	0.90	
Oakdale	.....	.....	.....	2.46	
Point Peter	104	53	78.7	2.06	
Poulan	98	55	78.7	3.73	
Putnam	102	56	81.6	0.55	
Quitman	103	55	82.3	1.99	
Ramsey	97	51	78.1	2.07	
Rome	97	55	79.0	1.91	
Talbotton	103	54	82.0	0.35	
Tallapoosa	95	53	77.8	0.95	
Thomasville	99	60	82.2	6.61	
Toccoa	98	55	79.2	3.05	
Union Point	98	55	80.3	1.83	
Washington	101	56	80.8	2.14	
Way Cross	101	55	81.4	4.37	
Waynesboro	99	54	79.0	4.05	
Westpoint	99	56	81.8	2.95	
Idaho.					
American Falls	99	28	61.6	0.48	
Atlanta	86	23	52.4	0.48	0.8
Blackfoot	98	24	62.0	0.61	T.
Burnside	88	24	56.2	1.13	9.5
Challis	94	28	61.4	0.26	
Chesterfield	90	19	54.6	T.	T.
Downey	92	19	55.2	T.	
Gray	89	24	54.0	0.68	0.2
Hagerman	103	32	66.6	0.42	
Idaho City	97	25	57.0	0.82	T.
Kootenai	82	29	55.5	1.13	T.
Lake	78	20	48.8	0.92	7.0
Lakeview	85	34	57.4	1.15	
Lewiston	88	45	66.0	0.81	
Lost River	84 *h*	23 *h*	58.7 *h*	0.68	T.
Marysville	89	18	53.6	1.04	
Moscow *f*	80	34	55.7	1.24	T.
Murray	84	32	53.5	1.76	
Oakley	103	36	63.4	0.90	
Ola	90	28	60.6	0.38	
Paris	94	17	56.8	0.72	
Payette	99	30	64.2	0.64	
Pollock	97	34	60.7	1.06	
Priest River *f*	85	34	55.6	1.23	
St. Maries	85	37	58.2	0.84	
Salubria	94	27	60.4	0.29	
Soldier	92	19	54.6	0.55	T.
Swan Valley	91	19	56.1	0.80	0.5
Weston *g*	91	31	60.7	0.08	
Yellow Jacket	.....	.....	.....	0.60	
Illinois.					
Albion	94	52	76.2	6.55	
Alexander	93	50	74.7	1.91	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Illinois—Cont'd.	°	°	°	*Ins.*	*Ins.*
Ashton	93	42	70.8	1.18	
Astoria	89	47	72.1	2.58	
Aurora *a*	94	46	72.0	1.59	
Aurora *b*	94	45	70.8	1.97	
Beardstown	.....	.....	.....	1.61	
Bloomington	95	45	73.8	4.05	
Bushnell	93	51	74.7	3.94	
Cambridge	90	49	72.0	2.86	
Carlinville	93	49	74.8	1.71	
Carlyle	.....	.....	.....	2.38	
Charleston	93	50	75.1	2.56	
Chemung	92	37	68.2	2.27	
Chester	.....	.....	.....	2.54	
Cisne	94	50	75.0	2.66	
Coatsburg	92	51	73.6	2.25	
Cobden	95	52	75.9	4.36	
Danville	97	40	73.4	1.49	
Decatur	93	45	74.0	2.11	
Dixon	92	46	71.2	1.91	
Dwight [1]	94	56	72.8	5.07	
Effingham	95	51	75.2	2.30	
Elgin	91	44	69.6	1.89	
Equality	99	50	75.6	3.53	
Flora	93	50	75.2	4.56	
Fort Sheridan	91	44	68.2	2.53	
Friendgrove [1]	96	60	76.4	5.21	
Galva	92	45	70.8	2.57	
Glenwood	.....	.....	.....	0.86	
Grafton	.....	.....	.....	2.58	
Grayville	97	55	78.2	4.78	
Greenville	97	53	76.7	2.58	
Griggsville	91	53	74.0	1.97	
Halfway	97	54	77.5	2.97	
Halliday	96	49	76.2	3.75	
Havana	91	54	75.0	2.24	
Henry	90	45	71.6	3.00	
Hillsboro	93	50	75.0	2.84	
Joliet	92	45	70.8	2.17	
Kankakee	94	42	73.2	2.31	
Knoxville	90	42	70.7	2.00	
Lagrange	91	45	70.1	1.86	
Laharpe	90	49	72.7	2.60	
Lanark	92	39	69.8	2.72	
Loami	.....	.....	.....	1.49	
McLeansboro	95	52	76.4	4.91	
Martinsville	93	50	74.8	2.25	
Martinton	93	40	71.8	2.22	
Mascoutah	96	50	75.6	3.59	
Mattoon	94	47	73.0	2.38	
Minonk	91	44	70.4	3.75	
Monmouth	92	44	72.0	1.24	
Monticello [b]	92	56	76.0	1.42	
Morrisonville	90	48	73.0	1.84	
Mount Carmel	.....	.....	.....	5.65	
Mount Pulaski	94	49	74.7	1.49	
Mount Vernon	91	49	73.7	1.94	
New Burnside	96	48	77.0	2.22	
Olney	96	50	75.6	3.95	
Oswego	94	42	71.8	1.55	
Ottawa [1]	100*	45	72.5	1.42	
Palestine	99	48	75.3	3.40	
Pana	93	50	74.0	4.01	
Paris	92	48	74.4	2.04	
Peoria *a*	.....	.....	.....	2.73	
Peoria *b*	97	49	74.8	2.60	
Philo	93	41	72.8	2.60	
Plumhill	94	51	74.7	3.76	
Rantoul	96	45	72.6	1.81	
Raum	94	56	77.2	3.32	
Riley	93	46	70.6	2.56	
Robinson	94	48	74.6	3.04	
Rockford	93	47	70.8	2.13	
Roundgrove	93	47	71.6	2.68	
St. Charles [1]	92	50	69.9	0.92	
St. John	99	52	77.0	4.73	
Savanna	.....	42	.....	4.72	
Scales Mound	92	41	68.8	3.20	
Strawn	91	46	71.3	4.07	
Streator	92	42	70.8	1.82	
Sullivan	91	42	73.2	1.28	
Sycamore	92	43	69.0	1.19	
Tilden	95	50	75.1	2.72	
Tiskilwa	93	48	71.7	3.89	
Tuscola	95	42	73.8	2.25	
Walnut	92	46	72.5	1.69	
Wheaton [2]	.....	56	69.6	1.39	
Winchester	94	51	74.9	3.06	
Winnebago	91	42	69.5	2.15	
Indiana.					
Anderson	92	42	73.3	1.92	
Angola	93	43	69.8	1.02	
Auburn	95	41	72.1	2.02	
Bedford	97	49	77.4	4.76	
Bloomington	94	50	75.0	2.34	
Bluffton	95	41	73.0	2.02	
Booneville	.....	.....	.....	4.30	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Indiana—Cont'd.	°	°	°	*Ins.*	*Ins.*
Bright	94	49	73.0	3.69	
Butlerville	92	46	73.4	4.51	
Cambridge City	94	40	71.5	1.80	
Columbia City [1]	91	44	71.4	1.59	
Columbus	93	45	72.9	2.27	
Connersville	95	45	73.0	2.64	
Delphi	95	38	73.5	2.82	
Edwardsville [1]	93	58	76.3	4.93	
Fairmount	94	42	73.4	3.02	
Farmland	92	42	71.4	1.13	
Fort Wayne	94	43	72.0	2.29	
Franklin [1]	91	57	74.0	1.94	
Greencastle	91	49	73.4	1.59	
Greensburg	93	60	75.2	2.13	
Hammond	90	44	72.8	1.36	
Hector	98	43	72.8	1.32	
Huntington	93	46	72.6	3.22	
Jeffersonville	95	54	76.1	3.85	
Knightstown	95	45	74.3	1.36	
Kokomo	95	45	73.0	2.97	
Lafayette	93	40	73.4	2.23	
Laporte	97	45	73.4	0.60	
Logansport	94	42	73.0	2.31	
Madison	95	53	75.0	5.32	
Marengo	94	48	72.7	6.83	
Marion	93	41	73.0	2.06	
Markle	94	40	71.3	2.00	
Mauzy	94	42	72.9	2.08	
Mount Vernon	98	.....	..	2.39	
Northfield	91	40	71.4	1.65	
Paoli	96	43	75.0	5.59	
Peru	94	42	72.8	1.86	
Princeton	98	48	75.9	3.65	
Richmond	92	40	72.0	1.86	
Rockville	91	47	72.6	4.28	
Salem	92	45	71.9	4.56	
Scottsburg	96	52	76.0	3.90	
Seymour	94	52	75.4	4.05	
Shelbyville	93	51	74.7	4.46	
South Bend	91	44	71.8	1.63	
Syracuse	92	42	70.2	1.98	
Terre Haute	94	49	75.2	2.82	
Topeka	87	43	68.9	1.72	
Valparaiso	90	44	70.4	3.00	
Vevay	96	52	76.6	7.65	
Vincennes	99	54	77.8	4.91	
Washington	98	52	76.2	4.24	
Winamac	96	38	73.4	2.97	
Worthington	96	47	75.2	2.87	
Indian Territory.					
Hartshorne	92	64	79.6	5.42	
Healdton	100	58	79.8	2.19	
Kemp	99	56	78.8	3.35	
Lehigh	95	59	78.6	2.42	
Muscogee	91	58	75.6	3.80	
Ryan	99	64	79.8	5.18	
Sapulpa	90	59	73.7	4.11	
South McAlester	.....	.....	.....	4.56	
Tahlequah	89	52	76.0*	2.30	
Tulsa	.....	.....	.....	5.82	
Wagoner	92	54	75.4	3.19	
Webbers Falls	.....	.....	.....	3.83	
Iowa.					
Afton	97	51	73.2	4.73	
Albia	92	48	72.0	2.54	
Algona [1]	91	58	69.8	5.56	
Alta *a*	92	50	69.0	8.66	
Amana	92	47	71.6	3.56	
Ames *b*	94	49	70.7	6.45	
Ames (near)	96	46	70.3	6.51	
Atlantic	96	46	71.0	5.70	
Audubon	89	46	69.2	6.27	
Bancroft	87	51	69.0	5.84	
Batavia	.....	.....	.....	2.66	
Baxter	93	48	71.0	3.56	
Belknap	89	54	72.6	3.45	
Belleplaine	92	48	71.0	6.02	
Blockton	93	47	72.4	1.47	
Bonaparte	90	51	72.2	1.65	
Britt	94	47	68.9	7.31	
Burlington	92	53	74.8	1.71	
Bussey	.....	.....	.....	2.25	
Carroll	94	49	69.7	7.25	
Carson	.....	.....	.....	7.99	
Cedar Rapids	93	50	73.2	3.46	
Centerville	90	54	72.9	2.43	
Chariton	89	52	71.1	2.52	
Charles City	90	47	69.4	5.46	
Chillicothe	.....	.....	.....	2.47	
Clarinda	100	48	73.4	1.54	
Clear Lake	88	52	69.8	6.07	
Clinton	92	45	71.5	3.01	
College Springs	98	52	73.4	1.31	
Coon Rapids	91	53	70.4	4.86	
Corning	92	48	71.2	3.29	
Council Bluffs	98	53	73.4	.....	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Iowa—Cont'd.	°	°	°	*Ins.*	*Ins.*
Cresco	89	43	67.4	6.06	
Cumberland	.....	.....	.....	4.61	
Danville	.....	.....	.....	2.40	
Decorah	90	42	68.3	5.51	
Delaware	89	46	70.6	5.03	
Denison	94	48	70.3	6.29	
Desoto	97	49	73.6	2.79	
Diagonal	93	47	71.3	3.30	
Dows	90	49	69.1	7.77	
Eldon	94	50	74.0	2.85	
Eldora	94	47	70.1	7.00	
Elkader	97	45	70.6	5.92	
Emerson	.....	.....	.....	6.92	
Fairfield	88	52	71.5	1.94	
Fayette	91	43	68.8	5.54	
Fonda	95	54	71.8	2.90	
Forest City	88	51	68.4	7.15	
Fort Madison	.....	.....	.....	3.59	
Galva	92	48	69.2	7.45	
Gilman	.....	.....	.....	5.49	
Gladbrook	.....	.....	.....	2.50	
Glenwood	94	52	72.0	5.97	
Grand Meadow [1]	86	54	67.4	6.43	
Greene	95	47	70.7	5.78	
Greenfield	94	51	71.2	4.08	
Grinnell (near)	89	50	70.1	5.44	
Griswold	.....	.....	.....	5.54	
Grundy Center	91	47	69.2	5.27	
Guthrie Center	92	51	69.6	3.85	
Hamburg	.....	.....	.....	1.69	
Hampton	92	50	69.4	6.76	
Harlan	94	47	71.2	7.53	
Hawkeye	.....	.....	.....	7.02	
Hedrick	91	46	71.9	2.35	
Hopeville	90	54	70.8	3.77	
Humboldt	91	49	70.6	7.56	
Independence	89	47	68.8	4.35	
Indianola	92	53	71.8	3.79	
Iowa City	92	48	72.0	4.50	
Iowa Falls	93	48	69.8	4.85	
Keosauqua	92	52	73.8	2.39	
Knoxville	91	53	72.2	2.50	
Lacona	.....	.....	.....	3.21	
Lamoni	94	50	72.3	2.93	
Lansing	93	45	69.5	6.01	
Larrabee	91	46	68.6	5.72	
Leclaire	.....	.....	.....	4.11	
Lemars	92	46	69.7	6.26	
Lenox	91	53	71.4	1.77	
Lockridge	.....	.....	.....	1.10	
Logan	95	45	71.0	11.99	
Maple Valley	.....	.....	.....	11.32	
Maquoketa	92	42	70.4	5.82	
Marshall	91	47	70.4	4.05	
Mason City	90	46	68.0	11.05	
Melrose	.....	.....	.....	1.51	
Monticello	92	45	69.6	4.34	
Mooar	88	46	70.4	2.96	
Mountayr	93	53	71.5	3.13	
Mount Pleasant	95	48	74.1	.....	
Mount Vernon *a* [1]	91	50	72.3	4.18	
Mount Vernon *b*	97	49	72.8	4.25	
Murray	.....	.....	.....	2.86	
New Hampton	90	46	69.3	4.10	
Newton	92	50	71.6	2.00	
Northboro	.....	.....	.....	2.49	
North McGregor	.....	.....	.....	6.62	
Northwood	89	47	67.6	5.89	
Odebolt	98	49	71.2	5.40	
Ogden	90	51	70.0	7.21	
Olin	89	47	70.6	4.87	
Onawa	93	50	71.4	6.36	
Osage	89	47	67.8	8.01	
Osceola	91	52	71.3	2.91	
Oskaloosa	91	51	72.2	1.55	
Ottumwa	91	52	73.0	3.01	
Ovid	89	52	71.2	3.67	
Pacific Junction	93	49	70.8	6.83	
Pella	88	51	69.0	2.67	
Plover	93	48	70.2	4.43	
Primghar	95	45	69.8	7.76	
Redoak	95	51	74.0	5.33	
Ridgeway	92	48	69.1	6.66	
Rockwell City	92	51	70.2	5.42	
Ruthven	90	42	66.0	8.50	
Scranton	94	53	71.4	4.68	
Sheldon	91	45	66.2	6.47	
Sibley	91	45	66.9	7.39	
Sigourney	97	45	73.8	1.99	
Sioux Center	94	49	70.4	5.78	
Spencer	92*	45	68.7	5.77	
Spirit Lake	96	48	68.4	10.39	
Storm Lake	89	51	68.6	7.98	
Stuart	100	50	73.2	3.35	
Tara	95	.....	.....	7.25	
Thurman	96	50	73.0	5.08	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Iowa—Cont'd.	°	°	°	*Ins.*	*Ins.*
Toledo	92	47	71.6	4.58	
Villisca	94	49	72.6	4.13	
Vinton *1	90	55[d]	70.4[e]	4.51	
Wapello	93	52	72.8	1.51	
Washington	90	47	70.6	2.00	
Washta	.....	.....	.....	7.84	
Waterloo	91	47	70.4	6.94	
Waverly	89	50	70.2	6.51	
Westbend *1	89	56	65.6	4.92	
Westbranch	92	42	69.4	5.29	
Westunion	.....	.....	.....	6.14	
Whitten *1	96[c]	57[c]	69.3[c]	5.14	
Wilton Junction [1]	92	45	72.6	4.19	
Winterset	91	50	71.8	3.69	
Woodburn	.....	.....	.....	4.39	
Kansas.					
Abilene	93	56	72.6	9.36	
Achilles	.....	.....	.....	3.29	
Altoona *2	93	61	74.0	6.22	
Anthony	.....	.....	.....	6.24	
Atchison *a*	94	54	73.7	5.16	
Atchison *b* *1	95	62	74.8	5.11	
Augusta	91	50	73.2	6.82	
Baker	97	54	74.0	5.85	
Burlington	93	53	74.4	8.30	
Campbell	99	53	74.8	5.46	
Chanute	90	53	74.8	6.42	
Colby	104	40	70.5	3.16	
Columbus	94	53	74.7	5.24	
Coolidge	109	43	72.2	2.07	
Cunningham	91	54	72.4	5.47	
Dresden	102	46	70.3	4.13	
Ellinwood	95	55	72.2	11.10	
Emporia	93	60	75.4	5.45	
Englewood	102	49	75.4	4.31	
Eskridge	94	56	74.7	5.67	
Eureka	.....	.....	.....	5.89	
Eureka Ranch	104	52	73.8	4.34	
Fallriver	95	54	74.1	5.88	
Fanning	94	43	72.0	2.98	
Fort Scott	94	55	76.4	6.89	
Frankfort	95	50	72.6	7.32	
Garden City	107	52	74.2	4.40	
Garfield	.....	.....	.....	9.58	
Gibson	100	52	72.4	3.92	
Gove *1	103	60	77.2	.....	
Grenola	92	52	73.4	4.60	
Halstead	95	54	74.8	7.46	
Hays	99	52	72.2	6.03	
Horton	96	55	73.6	5.93	
Hoxie	.....	43	.....	3.95	
Hutchinson	92	56	72.8	6.10	
Independence	95	56	76.3	4.00	
Lakin	.....	.....	.....	4.70	
Lawrence	92	57	73.4	3.02	
Lebanon	101	44	74.4	.....	
Lebo	96	53	74.0	5.61	
Macksville	94	50	72.7	6.44	
McPherson	93	53	73.2	7.27	
Manhattan *b*	96	55	74.6	7.50	
Manhattan *c*	96	54	75.3	7.29	
Marion	.....	.....	.....	5.70	
Meade	109	50	76.8	3.07	
Medicine Lodge	97	55	75.2	7.72	
Minneapolis	98	54	74.2	7.82	
Morantown	88	53	73.2	7.17	
Mounthope *1	90	62	73.9	7.03	
Ness City	104	54	75.5	4.94	
Newton	90	54	73.1	8.03	
Norwich	93	57	73.0	8.72	
Oberlin	.....	.....	.....	2.37	
Olathe	92	51	74.2	2.19	
Osage City	94	52	73.8	4.69	
Oswego	93	52	76.0	4.22	
Ottawa	93	52	74.6	4.03	
Paola	93	51	74.5	4.06	
Phillipsburg	.....	45	.....	4.03	
Pratt	92	54	73.2	6.24	
Rome *1	89	54	72.3	8.27	
Russell	100	51	74.3	5.90	
Salina	97	52	74.4	9.61	
Scott	106	43	72.8	3.09	
Sedan	91	54	75.2	5.23	
Seneca	95	52	72.2	5.64	
Toronto	90	50	72.7	4.46	
Ulysses	111	43	74.5	2.35	
Valley Falls	94	55	73.8	5.33	
Viroqua	110	42	74.9	0.58	
Wallace	.....	.....	.....	2.08	
Wamego *1	95	61	73.9	7.00	
Winfield	97	53	75.7	8.25	
Kentucky.					
Alpha *3	.....	54	74.4	4.08	
Bardstown	98	49	76.8	3.34	
Blandville	93	52	76.4	2.28	
Bowling Green *b*	100	51	78.1	1.93	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Kentucky—Cont'd.	°	°	°	*Ins.*	*Ins.*
Burnside	.....	.....	.....	5.72	
Canton *1	97	55	76.8	0.14	
Carrollton	96	58	77.8	4.84	
Catlettsburg	94	48	74.9	3.01	
Earlington	98	49	76.8	2.53	
Edmonton	94	48	75.1	2.67	
Ensor	97	52	76.4	3.61	
Eubank	96	45	73.7	1.41	
Falmouth	.....	.....	.....	4.15	
Fords Ferry	96	48	76.7	1.68	
Frankfort	97	58	77.5	2.25	
Georgetown	94	53	76.2	.....	
Greensburg	98	47	76.2	3.82	
Henderson	99	54	77.6	2.40	
Hopkinsville	99	47	76.0	1.20	
Irvington	93	50	75.7	3.65	
Jackstown	.....	.....	.....	1.98	
Leitchfield	95	50	75.1	2.84	
Loretto	96	44	75.2	2.59	
Marrowbone	97	44	75.7	2.57	
Maysville	99	47	75.4	5.54	
Middlesboro	95	46	74.4	1.92	
Mount Hermon	96	47	76.0	0.65	
Mount Sterling	95	49	75.0	2.36	
Owensboro	96	50	76.6	3.41	
Owenton	92	59	75.8	3.62	
Paducah *a*	.....	.....	.....	1.82	
Paducah *b*	100	56	79.7	1.54	
Princeton	98	49	76.6	1.45	
Richmond	98	49	77.0	1.66	
St. John	93	48	74.0	1.98	
Scott	93	48	73.4	4.84	
Shelby City	97	45	74.4	2.33	
Shelbyville	99	50	77.0	2.38	
Vanceburg	.....	.....	.....	3.93	
Williamsburg	99	54	78.2	2.64	
Louisiana.					
Abbeville	93	62	79.4	7.55	
Alexandria	97	56	79.6	2.63	
Amite	97	57	80.4	6.42	
Bastrop	98	55	80.6	1.65	
Baton Rouge	96	61	80.0	9.55	
Calhoun	96	58	79.7	1.94	
Cheneyville	97	50	78.0	4.96	
Clinton	96	57	79.2	5.11	
Como	.....	.....	.....	1.41	
Covington	95	58	79.8	6.53	
Donaldsonville	94	63	78.9	7.95	
Emilie	94	60	78.5	7.19	
Farmerville	93	56	78.4	2.94	
Franklin	97	62	80.8	7.05	
Grand Coteau	97	60	80.4	3.83	
Hammond	97	58	80.3	6.93	
Houma	94	62	81.4	3.37	
Jeanerette	99	59	79.6	8.66	
Jennings	96	60	78.0	4.62	
Lafayette	97	60	79.8	4.67	
Lake Charles	96	58	81.2	3.82	
Lake Providence	.....	58	.....	1.15	
L'Argent	94	57	79.2	5.80	
Lawrence	98	67	81.7	10.91	
Liberty Hill	103	56	81.0	3.34	
Mansfield	97	50	78.7	2.50	
Melville	.....	.....	.....	7.99	
Minden	98	55	80.3	3.81	
Monroe	95	60	80.0	3.11	
Montgomery	97	57	80.4	6.02	
New Iberia	94	61	79.8	10.90	
Oakridge	98	57	80.0	2.72	
Opelousas	95	59	79.4	3.39	
Oxford [4]	96	55	78.2	3.60	
Paincourtville	98	62	80.7	9.45	
Plain Dealing	97	55	78.1	4.09	
Plaquemine	96	59	78.4	7.14	
Rayne	98	61	79.8	6.06	
Robeline	96	54	78.0	4.55	
Ruston	98	55	79.2	2.80	
Schriever	99	61	80.0	7.73	
Southern University	91	62	76.6	4.70	
Sugar Ex. Station	94	64	80.6	13.33	
Sugartown	94	61	80.6	4.40	
Venice	91	63	78.8	8.09	
Wallace	97	61	80.4	8.04	
White Sulphur Springs	97	57	81.6	3.85	
Maine.					
Bar Harbor	85	39	62.5	1.36	
Belfast *6	82	50	63.8	2.09	
Calais	90	21	61.7	3.10	
Cornish *1	88	53	66.4	3.77	
Cumberland Mills	96	43	66.6	1.31	
Fairfield	90	40	64.2	1.39	
Farmington	93	34	64.4	2.41	
Flagstaff	87	33	60.1	1.19	
Gardiner	92	42	66.8	2.43	
Kineo	85	38	61.6	3.94	
Lewiston	95	46	66.5	2.04	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Maine—Cont'd.	°	°	°	*Ins.*	*Ins.*
Mayfield	89	41	62.4	2.04	
North Bridgton	93	41	66.4	2.42	
Orono	87	37	62.0	4.10	
Petit Menan *1	71	42	55.9	.....	
Winslow	91	37	62.9	1.13	
Maryland.					
Annapolis	96	54	76.6	2.05	
Bachmans Valley	92	45	70.6	2.42	
Berlin	98[d]	49[f]	74.1[d]	1.15	
Boettcherville	102	44	73.5	3.82	
Boonsboro *a*	97	48	73.6	2.97	
Cambridge	96	59	77.3	4.40	
Chase	100	46	73.2	1.50	
Chestertown	94	52	73.6	1.83	
Chewsville	95	46	75.0	4.19	
Clear Spring	94[e]	49[e]	71.4[e]	4.20	
Coleman	97	51	74.6	1.08	
Collegepark	98[c]	51[c]	73.8[c]	2.50	
Cumberland	97	54	74.2	2.85	
Darlington	96	52	73.0	1.31	
Deerpark	90[e]	36[e]	64.9[e]	6.24	
Easton	95	53	74.2	2.10	
Ellicott City	93	50	72.3	4.90	
Fallston	93	50	71.6	1.94	
Frederick	95	50	73.6	3.06	
Frostburg	93	46	69.5	4.37	
Grantsville	89	39	66.2	3.67	
Greatfalls	96	50	74.0	1.92	
Greenspring Furnace	96	48	72.5	4.17	
Hancock	100	46	74.0	4.55	
Harney	.....	.....	.....	3.39	
Jewell	96	50	73.7	2.71	
Johns Hopkins Hospital	98	52	74.3	2.04	
Laurel	101	48	74.5	3.03	
McDonogh [4]	95	53	74.0	.....	
Mardela Springs	94	51	73.8	1.69	
Mount St. Marys Coll.	93	54	72.0	3.48	
New Market	97	50	73.5	2.77	
Pokomoke City	98	53	75.2	3.47	
Princess Anne	95	50	73.2	2.79	
Prince Fredericktown	97	51	73.6[f]	.....	
Queenstown	94	54	73.9	3.86	
Rockhall *a*	97	56	74.6	4.85	
Rockhall *b*	95	50	73.9	3.84	
Sandy Point	101	53	76.4	1.15	
Sharpsburg	95	51	73.2	3.75	
Smithsburg *a*	93	47	72.6	4.29	
Smithsburg *b*	92	47	72.5	3.89	
Solomons	95	56	76.1	3.09	
Sudlersville	93	54	73.1	2.56	
Takoma Park	97	50	74.2	2.15	
Taneytown	95	50	72.2	3.80	
Van Bibber	96	54	73.6	2.60	
Walbrook	96	52	74.4	.....	
Westernport	93	46	70.0	4.53	
Woodstock	95	53	73.6	3.47	
Massachusetts.					
Adams	92	40	67.8	.....	
Amherst	91	42	67.6	4.62	
Attleboro	.....	.....	.....	3.55	
Bedford	91	48	67.3	3.90	
Bluehill (summit)	91	49	67.8	2.25	
Cambridge	94	50	70.1	2.90	
Chestnut Hill	96	46	70.8	2.73	
Cohasset	.....	.....	.....	2.53	
Concord	93	44	67.2	4.11	
East Templeton *1	92	54	67.1	4.91	
Fallriver	92	52	68.8	3.55	
Fiskdale	.....	.....	.....	4.17	
Fitchburg *a* *1	91	54	68.1	3.35	
Fitchburg *b*	92	44	68.4	4.29	
Framingham	95	48	70.2	2.48	
Groton	91	43	66.8	4.24	
Hyannis *1	94	52	66.0	5.10	
Jefferson	.....	.....	.....	7.37	
Lawrence	93	49	69.3	2.40	
Leeds	93	42	68.2	5.54	
Leominster	.....	.....	.....	4.18	
Long Plain	.....	.....	.....	3.53	
Lowell *a*	91	49	69.3	2.71	
Lowell *b*	93	47	68.2	.....	
Middleboro	93	43	67.2	3.96	
Monson	91	42	67.4	4.54	
New Bedford *a*	93	51	67.2	3.72	
New Bedford *b*	95	47	67.8	3.25	
New Salem	88	47	66.3	4.60	
Pittsfield	89	44	67.0	2.82	
Plymouth *1	96	56	68.5	2.89	
Princeton	.....	.....	.....	4.81	
Provincetown	85	51	66.4	4.41	
Salem	.....	.....	.....	2.59	
Somerset *1	104	48	72.1	3.05	
South Clinton	.....	.....	.....	5.49	
Springfield Armory	93	51	71.4	4.03	
Sterling	.....	.....	.....	4.39	
Tauntonc	92	43	67.6	4.07	

TABLE II.—*Climatological record of voluntary and other cooperating observers.*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean	Rain and melted snow.	Total depth of snow.
Massachusetts—Cont'd.	°	°	°	*Ins.*	*Ins.*
Webster	.....	.....	.....	4.03	
Westboro	93	49	70.0	3.25	
Weston	94	47	68.4	3.35	
Williamstown	86	40	66.1	3.66	
Winchendon	.....	.....	.....	5.74	
Worcester[b]	92	49	69.7	3.89	
Michigan.					
Adrian	94	44	69.6	3.35	
Agricultural College	92	43	68.2	1.15	
Allegan	90	40	71.8	.....	
Alma	93	41	68.4	1.02	
Ann Arbor	94	46	69.1	2.50	
Arbela	91	42	67.9	2.46	
Badaxe	91	42	66.7	4.18	
Baldwin	90	35	65.4	3.19	
Ball Mountain	93	42	67.6	1.49	
Baraga	96	.....	.....	4.89	
Battlecreek	93	43	70.7	4.17	
Bay City	91	45	67.6	1.91	
Berlin	93	37	65.5	2.12	
Berrien Springs	93	40	70.2	3.87	
Big Rapids	90	37	66.0	2.26	
Birmingham	97	42	70.1	1.16	
Boon	86	34	62.4	2.73	
Calumet	81	37	59.8	6.80	
Carsonville	90	32	65.0	3.80	
Charlevoix	87	40	62.0	3.98	
Cheboygan	90	39	62.1	4.50	
Clinton	94	44	70.2	2.22	
Coldwater	98	42	70.4	2.76	
Eagle Harbor	84	36	57.2	5.10	
East Tawas	89	41	65.1	2.04	
Eloise	95	43	70.2	1.51	
Ewen	87	35	61.0	3.30	
Fairview	90	44	68.6	1.69	
Fitchburg	93	41	67.8	2.60	
Flint	93	39	67.2	2.04	
Gladwin	92	39	66.6	3.15	
Grand Rapids	90	43	70.8	1.27	
Grape	94	44	70.8	2.18	
Grayling	89	36	64.6	4.85	
Hanover	93	42	69.2	2.50	
Harrison	91	36	64.4	3.99	
Harrisville	88	38	62.6	5.09	
Hart	89	37	65.4	1.71	
Hastings	94	40	69.4	1.25	
Hayes	92	38	66.0	3.00	
Highland Station	.....	.....	.....	1.52	
Hillsdale	93	42	69.1	3.02	
Howell	92	43	67.8	.....	
Humboldt	87	30	57.2	4.45	
Ionia	94	41	72.8	0.82	
Iron Mountain	88	32	62.6	4.25	
Ishpeming	86	36	61.3	5.38	
Ivan	89	37	64.8	4.21	
Jackson	94	43	71.0	2.58	
Jeddo	91	42	65.6	1.67	
Kalamazoo	93	42	70.0	4.54	
Lake City	88	36	64.4	1.80	
Lansing	92	42	68.4	1.15	
Lapeer	94	35	66.7	1.69	
Ludington	81	35	62.0	2.95	
Luzerne	89	34	64.6	4.36	
Mackinaw	82	30	59.5	4.29	
Madison	96	44	71.0	2.89	
Mancelona	85	35	63.3	5.73	
Manistee	89	50	70.4	.....	
Manistique	75	38	57.4	6.41	
Menominee	87	41	64.2	3.68	
Mottville	89	39	68.8	1.72	
Mount Clemens	97	41	69.6	5.50	
Mount Pleasant	93	41	68.2	2.18	
Muskegon	84	45	66.4	1.56	
North Marshall	93	42	69.0	2.02	
Northport	88	42	62.6	3.83	
Old Mission	89	44	65.2	5.28	
Olivet	89	42	68.8	2.35	
Omer	94	41	65.2	1.70	
Ovid	94	42	68.8	2.11	
Plymouth	95	47	69.7	1.68	
Port Austin	98	38	68.8	1.70	
Reed City	92	36	64.6	2.36	
Rogers	89	39	60.2	5.76	
Romeo	96	45	68.8	2.11	
Saginaw	94	45	69.5	0.98	
St. Ignace	75	37	58.2	2.38	
St. Johns	92[1]	49[1]	69.6[1]	1.93	
St. Joseph	90	44	69.3	1.23	
Sandbeach	91	38	63.0	3.14	
Sidnaw	89	31	60.8	1.90	
Somerset	91	42	68.0	3.78	
South Haven	86	47	66.0	2.21	
Stanton	91	37	68.0	1.30	
Thomaston	90	42	67.0	6.50	
Thornville	90	45	68.5	1.65	
Traverse City	92	43	66.3	5.06	
Michigan—Cont'd.	°	°	°	*Ins.*	*Ins.*
Valley Center[b]	84	41	59.1	2.21	
Vandalia	91	42	69.8	2.73	
Vassar	94	42	67.7	1.68	
Wasepi	90	42	68.4	2.66	
Waverly	88	40	67.0	1.56	
West Harrisville	88	40	62.8	6.70	
Wetmore	84	28	59.8	4.49	
White Cloud	91	37	67.6	1.86	
Ypsilanti	92	45	68.0	2.42	
Minnesota.					
Ada	87	37	64.6	4.82	
Albert Lea	85	51	66.7	9.75	
Alexandria	91	41	65.3	5.71	
Ashby	89	40	65.3	2.87	
Beardsley	90	42	64.4	6.71	
Bermidji	90	33	61.2	2.27	
Bird Island	88	45	66.2	4.74	
Blooming Prairie	87	44	67.3	10.30	
Brainerd	86	42	64.8	7.46	
Caledonia	87	45	66.6	7.98	
Camden	93	45	67.6	4.47	
Campbell	94	42	65.2	2.50	
Collegeville	85	43	66.1	2.53	
Crookston	85	41	63.2	3.73	
Deephaven	.....	.....	.....	6.80	
Detroit City	86	36	62.8	8.66	
Faribault	85	48	67.6	9.23	
Farmington	90	46	65.7	6.16	
Fergus Falls	85	42	65.0	3.28	
Grand Meadow	91	45	67.6	12.05	
Granite Falls	89	43	65.2	2.89	
Hallock	88	36	64.4	.....	
Lake City	89	43	67.3	6.81	
Lake Jennie	91	50	68.4	2.60	
Lakeside	87	46	66.6	4.50	
Lake Winnibigoshish[1]	82	47°	60.7	7.21	
Leech Lake	90	35	64.8	4.38	
Leroy	89	44	68.3	.....	
Long Prairie	87	37	63.8	4.42	
Luverne	88	46	66.6	7.60	
Lynd	85	43	64.8	4.16	
Mapleplain[1]	85	48°	66.3	5.04	
Milaca	95	39	65.6	2.58	
Milan	90	43	65.8	3.42	
Minneapolis[a]	88	46	67.9	6.55	
Minneapolis[b][1]	87°	44	66.4	6.60	
Minnesota City*[1]	90	50	69.4	14.35	
Montevideo	92	43	67.6	4.16	
Morris	88	44	66.9	4.87	
Mount Iron	85	34	60.6	6.24	
Newfolden	85	37	62.8	3.29	
New London	87	44	64.9	3.51	
New Richland*[1]	86	56	67.1	.....	
New Ulm	90	50	69.8	8.43	
Park Rapids	82	37	62.2	9.06	
Pine River	89	39	62.6	5.72	
Pipestone	86	43	65.4	3.12	
Pleasant Mounds	82	49	66.4	12.77	
Pokegama Falls	82	36	60.7	6.81	
Redwing	.....	.....	.....	6.60	
Reeds	.....	.....	.....	7.14	
Rolling Green	85	51	67.2	9.15	
Roseau	87	36	62.4	1.64	
St. Charles	88	45	67.3	13.23	
St. Cloud	80	43	64.8	2.78	
St. Peter	82	50	67.0	8.38	
Sandy Lake Dam	80	40	61.7	4.94	
Shakopee	85	51	68.4	6.19	
Tower	89	36	59.6	6.40	
Two Harbors	82	35	55.4	7.55	
Wabasha*[1]	88	53	68.4	6.32	
Willmar	87°	46°	65.5°	2.59	
Willow River	85	37	60.6	7.39	
Winnebago City	88	51	68.5	13.91	
Worthington	85	48	66.1	8.51	
Zumbrota[1]	86°	42	67.4	.....	
Mississippi.					
Aberdeen	96	54	79.8	5.03	
Agricultural College	98	58	80.2	1.82	
Americus	100	59	80.2	7.08	
Austin	95	53	78.2	1.52	
Batesville	99	55	79.2	2.33	
Bay St. Louis	93	65	80.0	7.92	
Biloxi	92	60	77.2	9.20	
Booneville	96	54	78.3	2.10	
Briers	.....	62	.....	2.02	
Brookhaven	104	56	81.2	4.97	
Canton	97	53	78.4	3.75	
Columbus[a]	.....	.....	.....	4.03	
Columbus[b]	99	57	79.9	3.33	
Corinth	96	54	78.1	1.91	
Crystal Springs	100	55	80.2	3.66	
Edwards	99	60	81.4	6.15	
Fayette	.....	58	.....	7.70	
Fayette (near)*[1]	92	63	80.2	.....	
Greenville[a]	94	62	79.9	1.41	
Mississippi—Cont'd.	°	°	°	*Ins.*	*Ins.*
Greenville[b]	94	61	80.6	1.51	
Hattiesburg	98	60	80.2	5.28	
Hazlehurst	93	59	78.9	3.79	
Hernando	97	57	79.3	1.30	
Holly Springs	98	57	79.7	2.12	
Jackson	98	56	80.2	4.55	
Lake	99	52	75.5	3.68	
Leakesville	103	53	80.0	7.66	
Logtown	94	52	79.0	8.77	
Louisville	96	52	77.4	3.60	
Macon	100	56	81.8	3.79	
Magnolia	99	57	79.8	8.80	
Natchez	97	60	80.7	3.95	
Okolona	104	54	81.9	0.85	
Palo Alto	99	58	80.5	0.75	
Pontotoc	98	52	79.0	2.60	
Port Gibson	99	56	79.9	5.26	
Rosedale	94°	56°	79.0°	2.76	
Stonington*[1]	94	60	78.8	.....	
Thornton	.....	.....	.....	2.50	
Tupelo	.....	.....	.....	1.48	
Walnut Grove	94[1]	65°	81.4°	5.38	
Water Valley*[1]	99	59	77.4	1.89	
Waynesboro	98	57	78.0	2.45	
Windham	100	53	79.2	4.25	
Woodville	97	57	79.5	3.31	
Yazoo City	100	53	82.0	1.13	
Missouri.					
Appleton City	98	55	77.4	5.33	
Arlington	.....	.....	.....	1.90	
Arthur*[3]	.....	62	73.9	8.86	
Avalon	89	55	73.4	3.94	
Bagnell	.....	.....	.....	3.21	
Bethany	92	48	73.4	2.90	
Birchtree	90	50	73.0	4.01	
Boonville	.....	.....	.....	5.68	
Brunswick	89	56	74.4	3.40	
Carrollton	90	57	74.8	2.91	
Conception	92	56	73.6	3.72	
Cook Station	94	44	73.8	2.50	
Cowgill*[5]	90	60	75.4	3.17	
Darksville	99	55	76.8	6.25	
East Lynne*[3]	.....	55	70.6	4.99	
Edgehill*[5]	92	58	75.9	3.88	
Eightmile*[1]	87	56	71.2	4.68	
Eldon	91	47	73.4	2.40	
Elmira	92	49	74.0	3.96	
Fairport	.....	.....	.....	5.70	
Fayette	88	54	73.1	4.76	
Fulton	.....	.....	.....	3.68	
Gallatin*[1]	92	56	73.5	2.82	
Gayoso	101	51	79.6	1.88	
Glasgow	90	53	74.0	3.60	
Gorin	.....	.....	.....	3.55	
Halfway	88	50	73.6	4.45	
Harrisonville	91	53	74.2	5.64	
Hazlehurst	.....	.....	.....	3.01	
Hermann	.....	.....	.....	2.60	
Houston	94	48	73.4	1.53	
Houstonia (near)	.....	.....	.....	5.95	
Irena	.....	.....	.....	2.38	
Ironton	94	45	73.8	4.90	
Jackson*[3]	90	60	75.1	2.98	
Jefferson City	98	51	75.4	3.21	
Kidder	89	53	72.3	3.88	
Lamar	93	54	75.3	5.92	
Lamonte	.....	.....	.....	4.71	
Lebanon	90	53	74.6	5.40	
Lexington	92	53	74.4	4.30	
Liberty	91	52	73.5	2.39	
Louisiana	93	49	74.6	2.23	
McCune*[1]	92	58	74.1	2.57	
Marblehill	94	46	74.4	3.26	
Marshall	89	51	73.4	4.95	
Maryville	95	52	72.8	3.79	
Mexico	93	52	75.8	5.16	
Miami*[5]	90	60	76.0	3.62	
Mineralspring	91	49	72.3	3.05	
Montreal	89	48	73.2	1.97	
Mount Vernon	91	53	75.0	9.05	
Neosho	89	50	73.2	5.74	
Nevada	88	52	73.2	7.18	
New Haven	93	53	75.8	3.13	
New Madrid	99	54	79.8	3.92	
New Palestine	89	54	73.8	5.94	
Oakfield	92	53	75.0	2.54	
Olden	89	50	71.7	2.63	
Oregon[a]	94	55	73.6	5.90	
Oregon[b]	97	57	75.5	5.69	
Palmyra*[5]	92	60	76.6	2.05	
Phillipsburg*[1]	92	58	73.1	2.29	
Pickering*[3]	.....	50	68.2	3.49	
Poplarbluff	95	50	76.4	4.48	
Potosi	96	42	72.5	1.58	
Princeton	99	50	73.6	2.89	
Rhineland	93	48	74.6	.....	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Missouri—Cont'd.	°	°	°	*Ins.*	*Ins.*
Richmond	90	56	73.8	4.93	
Rolla				3.90	
St. Joseph				3.85	
Sarcoxie *2		52	74.0	4.75	
Sedalia	94	50	73.4	5.53	
Seymour	89	50	72.1	2.17	
Shelbina				6.30	
Sikeston	95	52	76.4	5.54	
Steffenville	90	53	73.4	4.75	
Stellada	91	55	74.8	3.33	
Sublett *	94	50	74.0	6.28	
Trenton	92	53	73.8	4.14	
Unionville	98	55	76.2	2.01	
Vichy	96	54	76.4	2.54	
Warrensburg	90	54	74.6	5.74	
Warrenton	92	51	74.6	1.62	
Wheatland				6.71	
Willow Springs	96	50	75.2	2.71	
Wylie	92	53	74.9	5.27	
Zeltonia	92	48	74.4	2.74	
Montana.					
Adel	82	26	52.2	1.93	
Billings	96	36	64.2	T.	
Boulder	88	30	56.2	1.02	T.
Butte	84	32	55.9	0.55	
Canyon Ferry	90	34	60.8	0.62	
Chinook	89	37	59.6	1.57	
Columbia Falls	88	31	55.0	2.48	
Corvallis	89	34	58.5	0.04	
Crow Agency	92	37	62.3	2.73	
Dearborn Canyon	90	33	56.2	1.23	
Deer Lodge	90	27	55.8		
Dell	88	27	54.2	1.63	9.5
Ekalaka	92	33	58.5	2.59	
Fort Benton	90	39	58.5	3.40	
Fort Keogh	94	39	63.4	2.38	
Fort Logan	85	30	54.8		
Glasgow	88	35	60.5	1.92	
Glendive	96	41	63.2	3.85	
Glenwood	88	31	55.6	1.77	
Greatfalls	94	41	60.6	0.88	
Kipp	79	32	54.4	2.84	3.0
Manhattan	88	29	57.3	1.40	0.5
Martinsdale	85	31	56.0	0.17	
Marysville	82	32	52.5	1.99	1.5
Missoula	92	32	57.8	1.28	
Ovando	77	28	52.0	1.99	
Parrot	87	33	58.0	1.38	T.
Plains	82	30	57.5	0.10	
Poplar	90	39	62.3	2.83	
Ridge	91	33	59.4	3.65	
St. Ignatius	85	31	57.3	1.04	
St. Pauls	86	34	57.2	2.28	
Troy	92	33	56.4	1.26	
Utica	92	30	56.4	1.22	
Wibaux	90	38	60.4	7.37	
Yale	90	31	56.5	0.11	
Nebraska.					
Agee *1	105	46	69.1	4.40	
Albion	94	44	69.2	6.13	
Alliance				1.30	
Alma *1	103	55	73.2	4.53	
Ansley	105	40	69.2	5.67	
Arapaho *1	104	54	73.4		
Arborville *1	100	46	72.4	6 01	
Ashland *a*	96	52	72.0	10.65	
Ashland *b* *1	104	58	75.4	11.65	
Ashton				4.38	
Auburn	97	50	73.0	3.31	
Aurora *1	97	55	71.7	4.66	
Bartley				3.36	
Bassett				3.57	
Beatrice	97	50	71.8	3.74	
Beaver City	108	44	72.3	2.86	
Bellevue				7.42	
Benedict				6.70	
Benkleman				0.90	
Blair	93	53	70.4	10.55	
Bluehill				7.47	
Bradshaw				8.47	
Brokenbow				4.47	
Burchard				4.18	
Burwell				3.93	
Callaway	104	40	66.0	5.65	
Camp Clarke	102	36	67.7	1.53	
Central City				6.73	
Chester				9.62	
Clatonia	99	58	75.2	6.39	
Cody				1.65	
Columbus	95	48	70.6	5.80	
Creighton	98	43	69.7	4.67	
Crete	95	50	72.7	8.49	
Culbertson				3.61	
Curtis *a*	102	43	66.8	3.24	
David City	99	52	72.9	6.05	
Dawson	98	51	74.4	3.24	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Nebraska—Cont'd.	°	°	°	*Ins.*	*Ins.*
Eden				3.46	
Edgar *a* *5	99	58	77.6	5.57	
Elba				4.31	
Ericson *1	102	52	71.8	4.95	
Ewing				4.53	
Fairbury	98	49	71.8	4.30	
Fairfield	100	49	70.8	4.50	
Fairmont	98	42	70.2	6.10	
Fort Robinson	101	35	68.0	1.80	
Franklin	100 *a*	43 *a*	71.0 *a*	5.61	
Fremont	91	50	70.2	10.17	
Geneva	98	47	73.4	6.04	
Genoa	97	48	71.2	4.25	
Gering	101	35	66.2	1.77	
Gordon				1.80	
Gothenburg	103	42	68.9	2.16	
Grand Island *a*				6.57	
Grand Island *b*	101	46	68.2	7.02	
Grand Island *c*	101	46	71.4	6.80	
Greeley				3.95	
Haigler				3.23	
Hartington	94	45	68.5	7.68	
Harvard	96	48	71.0	3.85	
Hastings *1	95	55	71.8	4.55	
Hayes Center				1.52	
Hay Springs	96	35	63.7	1.97	
Hebron	97	50	71.7	7.33	
Hickman				3.92	
Hooper *1	94	58	71.9	9.62	
Hubbard				4.10	
Imperial	107	38	71.9	4.22	
Johnstown				1.90	
Kearney				7.93	
Kennedy	104			3.47	
Kimball	98	35	64.2	1.06	
Kirkwood *1	105	52	68.8	3.19	
Lexington	105	38	69.1	4.12	
Lincoln *b*	95	50	71.8	8.65	
Lincoln *d*	97	50	73.3	7.26	
Lodgepole	102	32	67.4	1.40	
Loup *1	100	48	68.6	8.20	
Lynch	102	44	70.9	3.23	
Lyons				6.14	
McCook				2.28	
McCool				5.18	
Madison	94	46	69.4	5.46	
Madrid *5	96	45	73.4	1.73	
Marquette				4.08	
Merriman				1.00	
Minden *a*	105	46	70.8	9.61	
Minden *b*				8.60	
Monroe				3.55	
Nebraska City *b*				2.33	
Nebraska City *c*	97	52	72.9	2.89	
Nemaha *1	100	56	73.0	2.68	
Nesbit	99	41	67.3	2.18	
Norfolk *b*	97	44	69.9	4.41	
North Loup	102	50	75.5	5.58	
Oakdale	102	44	70.0	5.42	
Odell				5.80	
O'Neill	103	43	68.4	4.17	
Ord				3.60	
Osceola				5.73	
Ough				1.69	
Oxford	104	60	78.3		
Palmer *b*				4.45	
Palmyra				4.83	
Paxton				3.29	
Plattsmouth *a*				6.18	
Plattsmouth *b*				5.26	
Pleasant Hill				7.53	
Ravenna *a*	104	44	70.0	8.91	
Ravenna *b*				6.58	
Redcloud *b* *1	90	52	70.0		
Republican *1	102	60	75.5	5.37	
Rulo				3.05	
St. Libory				5.30	
St. Paul				5.32	
Salem *1	94	64	77.0	2.00	
Santee Agency	102	47	72.2	3.97	
Sargent				3.86	
Schuyler				6.06	
Seneca *1	96	38	65.7	0.80	
Seward *1	94	50	71.6	8.80	
Sprague				3.77	
Springview	101	42	67.6	2.84	
Stanton				5.89	
State Farm	97	50	72.0	8.23	
Strang *1	94	58	75.0	5.11	
Stratton				3.02	
Superior *5	99	54	75.0	5.61	
Syracuse				2.87	
Tablerock				5.43	
Tecumseh *b*	99	52	73.6	3.43	
Tecumseh *c*				4.25	
Tekamah	94	49	70.7	11.76	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Nebraska—Cont'd.	°	°	°	*Ins.*	*Ins.*
Thedford				2.57	
Turlington	98	53	72.2	3.49	
Valentine	100	40	67.9	2.69	
Valparaiso				9.03	
Wakefield	95	46	69.4	3.20	
Wallace				2.63	
Wauneta				2.80	
Weeping Water *1	97	50	70.1	8.42	
Westpoint	93	50	72.4	5.00	
Whitman				1.95	
Wilber *1	98	56	71.0	5.99	
Willard				1.71	
Wilsonville *1	103	56	74.9	3.00	
Wisner				5.05	
Wymore *1	93	60	74.1	4.71	
York *1	98	54	73.6	6.12	
Nevada.					
Battle Mountain *1	98	48	66.3	1.25	
Beowawe *1	94	45	65.2		
Candelaria	95	39	66.4		
Carlin *1	84	30	55.8	0.25	
Carson City	92	33	61.5	0.39	
Clover Valley				0.65	
Cranes Ranch				0.75	
Elko	95	24	58.9	2.00	
Ely	95	29	60.4	0.95	
Empire Ranch	100	30	67.4	0.72	2.5
Fenelon *1	85	32	54.6	1.00	
Golconda *1	98	38	62.8	1.28	
Halleck *1	102	41	62.5	T.	
Hawthorne *b*	95	43	67.2	0.10	
Humboldt *1	92	45	65.8	0.43	
Lee				0.04	T.
Lewers Ranch	91	34	61.2	0.06	
Los Vegas	95	50	70.4	0.25	
Lovelocks *1	94	48	66.6	0.28	
Mill City *1	102	45	65.5	0.05	
Monitor Mill	90	33	59.6	0.95	
Palisade *1	103	45	69.2	2.62	
Palmetto	92	34	61.7	1.13	4.0
Reno	93	36	63.6	0.40	
St. Clair	93	38	64.6	0.21	
Silverpeak	102	46	76.6	0.22	
Sodaville	100	41	70.6	0.15	
Tecoma *1	100	40	61.6	0.10	
Tuscarora	84	34	57.5	1.25	
Tybo	97	35	66.0	0.63	
Verdi *1	100	40	73.0	0.03	
Wadsworth *1	94	36	63.4	0.00	
Wells	94	21	58.5	0.34	
New Hampshire.					
Alstead *6	88	50	68.7	1.33	
Berlin Mills	90	33	61.8	2.85	
Bethlehem	86	40	64.6	2.92	
Brookline *1	93	42	69.0	3.97	
Claremont		38		1.23	
Concord	94	37	66.4	1.04	
Durham	93	45	66.3	1.14	
Grafton	91	30	63.2	2.71	
Hanover	90	38	65.4	3.48	
Keene	93	37	66.0	2.80	
Nashua	94	44	68.4	4.01	
Newton	92	39	66.4	2.45	
North Conway	94	36	65.8	1.65	
Peterboro	89	37	65.3	3.97	
Plymouth	96	33	65.4	2.74	
Sanbornton	90	36	63.9	1.97	
Stratford	88	33	64.4	2.62	
Warner				1.47	
New Jersey.					
Asbury Park	98	52	70.4	2.70	
Bayonne	102	54	74.3	2.16	
Belvidere	97	42	70.2	3.40	
Bergen Point	97	55	73.0	2.25	
Beverly	102	50	74.7	1.89	
Billingsport *1	93	60	74.2	2.29	
Boonton	96	45	69.4	1.84	
Bridgeton	101	50	75.8	2.57	
Camden	95	56	73.2	1.85	
Cape May C. H.	99	50	73.3	1.01	
Charlotteburg	94	38	67.9	3.15	
Chester	95	45	69.8	2.73	
Clayton	100	50	73.9	3.06	
College Farm	99	52	72.9	3.54	
Deckertown	95	41	70.0	2.60	
Dover	100	42	70.5	1.78	
Egg Harbor City	101	49	72.5	3.48	
Elizabeth	102	51	74.4	1.55	
Englewood	97	46	71.4	4.34	
Flemington	100	48	72.3	3.31	
Freehold	95	50	71.3	2.38	
Friesburg	100	47	73.8	2.89	
Hammonton				2.38	
Hanover	96	44	70.8	2.50	
Hightstown	98	55	73.6	2.77	
Imlaystown	98	53	75.2	2.95	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
New Jersey—Cont'd.	°	°	°	*Ins.*	*Ins.*
Lebanon	.....	.....	.....	2.72	
Moorestown	96	52	72.8	2.08	
Mount Pleasant	.....	.....	.....	2.84	
Newark	98	50	72.0	1.06	
New Brunswick	100	52	74.2	3.62	
Newton	96	42	70.2	4.18	
Ocean City	96	54	69.8	1.60	
Oceanic	96	56	72.8	3.18	
Paterson	102	51	74.0	2.53	
Perth Amboy	102	54	74.3	3.73	
Plainfield	98	48	72.0	1.70	
Rancocas	.....	.....	.....	1.58	
Rivervale	98	44	69.6	2.50	
Rocktown	.....	.....	.....	2.88	
Roseland	99	43	70.6	2.92	
Salem	99	51	74.3	1.99	
Somerville	102	47	73.2	2.81	
South Orange	97	51	72.1	1.08	
Toms River	103	47	72.0	3.10	
Trenton	98	55	74.8	2.79	
Tuckerton	102	47	72.3	1.84	
Vineland	102	51	73.7	2.94	
Woodbine	96	50	72.6	2.40	
New Mexico.					
Albert	101	47	76.2	0.72	
Albuquerque	97	43	74.2	0.44	
Alma	97	32	69.5	1.76	
Aztec	94	36	66.6	0.70	
Bell Ranch	.....	.....	.....	1.53	
Bernalillo	97	41	71.8	0.42	
Bluewater	100	31	67.2	0.40	
Cambray	.....	.....	.....	0.31	
Clayton	95	46	69.9	1.35	
Deming	.....	.....	.....	T.	
East Lasvegas	94	36	66.6	2.65	
Espanola	96	38	68.3	1.34	
Folsom	95	36	67.6	1.06	
Fort Bayard	95	37	65.8	1.33	
Fort Union	90	36	64.0	0.95	
Fort Wingate	94	33	66.2	0.42	
Gage	.....	.....	.....	0.00	
Gallisteo	89	40	68 2	0.65	
Gallinas Spring	102	47	72.9	2.04	
Gila	100	39	74.8	1.04	
Hillsboro	99	51	76.0	0.30	
Las Vegas Hotsprings	92	39	65.8	2.10	
Lordsburg	.....	.....	.....	0.70	
Los Lunas	97	40	70.5	0.70	
Lower Penasco	96	44	72.4	1.70	
Mesilla Park	98	36	72.2	0.63	
Monero	94	25	59.8	0.58	
Olio	100	36	70.6	T.	
Puerto de Luna	103	47	75.3	2.27	
Raton	95	39	66.0	1.85	
Rincon	100	50[f]	76.4[e]	0.23	
Roswell	101	46	74.4	1.62	
San Marcial	96	42	72.3	0.59	
Shattucks Ranch	98	42	69.0	3 07	
Socorro	100	42	74.8	0.22	
Springer	102	29	67 6	0.21	
Strauss	.....	.....	.....	0.53	
White Oaks	91	41	68.3	0.69	
Winsors Ranch	84	14	53.6	3.29	
New York.					
Adams	.....	.....	.....	1.68	
Addison	93	40	68.1	2.96	
Akron	.....	.....	....	1.04	
Alfred	87	37	65.6	1.80	
Angelica	90	35	66.2	1.81	
Appleton	92	42	67.0	0.18	
Arcade	86	38	65.2	1.78	
Atlanta	.....	.....	.....	1.18	
Auburn	92	44	69.4	3.51	
Avon	93	40	69.2	0.84	
Axton	86	34	63.6	1.78	
Baldwinsville	92	46	68.7	1.65	
Bedford	94	45	68.2	4.73	
Bolivar	90	35	64.6	2.19	
Bouckville	86	41	64.8	3.08	
Boyds Corners	.....	.....	.....	5.38	
Brentwood	98	43	68.2	1.80	
Caldwell	91	42	67.0	2.27	
Canajoharie	89	38	67.6	4.19	
Canton	88	39	65.4	2.10	
Carmel	96	52	71.4	6.73	
Carvers Falls	91	40	66.4	1.24	
Catskill	95	47	70.1	2.28	
Cedarhill	98	40	72.0	2.36	
Chenango Forks	.....	.....	.....	3.60	
Cherry Creek	.....	.....	.....	1.96	
Cooperstown	87	40	65.1	2.85	
Cortland	91	36	66.6	2.25	
Cutchogue	95	50	70.5	2.21	
DeKalb Junction	.....	.....	.....	1.60	
Dryden	90	34	65.6	1.69	
Ellenburg Depot[*1]	92	51	65.4	1.60	
New York—Cont'd.					
Elmira	97	52	72.0	2.84	
Fayetteville	.....	.....	.....	2.28	
Fleming	89	46	68.2	2.60	
Franklinville	87	34	64.2	2.65	
Fulton	.....	.....	.....	1.04	
Garrattsville	88	39	65.0	4.06	
Glens Falls	91	52	69.8	1.38	
Gloversville	89	39	65.9	3.46	
Greenwich	93	42	67.4[e]	2.08	
Haskinville	.....	.....	.....	0.48	
Hemlock Lake	89	46	69.5	1.34	
Honeymead Brook	96	44	69.1	2.66	
Hopewell	89	38	67.6	2.17	
Humphrey	86	45	66.4	1.76	
Ithaca	95	38	67.8	1.99	
Jamestown	87	44	67 2	3.29	
Keene Valley	89	37	64.2	1.39	
King Station	.....	.....	.....	1.20	
Lake Hill	89	43	65.8	4.50	
Liberty	.....	47	.....	4.48	
Little Falls	86	43	65.5	3.21	
Lockport	91	44	67.8	0.25	
Lowville	86	38	64.4	1.84	
Lyndonville	.....	.....	.....	T.	
Lyons	91	47	68.7	1.32	
Mayle	.....	.....	.....	0.88	
Middletown	92	46	69.2	6.01	
Mohonk Lake[*1]	86	55	68.8	3.62	
Mount Morris	98	40	68.8	0.02	
Newark Valley	.....	....	.. ..	2.14	
New Lisbon	88	32	62.6	3.67	
North Germantown	97	50	71.2	3.29	
North Hammond	90	44	66.2	1.83	
North Lake	84	38	62.0	2.21	
Number Four	83	35	61.4	1.29	
Nunda	94	38	68.8	1.22	
Ogdensburg	82	48	65.8	1.46	
Oneonta	92	30	66 4	4.82	
Oxford	94	37	66.8	4.30	
Palermo	91	41	65.6	1.49	
Penn Yan	95	41	70.6	1.42	
Perry City	92	34	67.2	2 38	
Phenix	.....	.....	.....	2.09	
Pine City	.....	.....	.....	2.94	
Plattsburg Barracks	93	32	60 0	1.85	
Port Byron	90	42	67.2	3.07	
Port Jervis	93	39	69.2	4.71	
Poughkeepsie	98	36	68.8	1.74	
Primrose	98	47	70.4	4.13	
Richmondville	87	41	66.0	2.32	
Ridgeway	89	44	67.2	0.27	
Rome	92	41	66.0	2.82	
Romulus	93	43	68.8	1.04	
Rose	.....	.....	.....	1.62	
St. Johnsville	91	40	68.0	5.38	
Saranac Lake	88	38	66.8	1.69	
Saratoga Springs	90	42	66.8	1.73	
Schenectady	93	47	71.2	1.85	
Scottsville	.....	.....	.....	1.76	
Setauket	92	53	69.9	3.08	
Sherwood	.....	.....	.....	2.47	
Skaneateles	.....	.....	.....	2.61	
South Canisteo	90	36	64.9	2.48	
Southeast Reservoir	.....	.....	.....	5.52	
South Kortright	91	31	65.6	4.24	
Straits Corners	95	35	65.4	2.44	
Volusia	86	44	66.2	2.57	
Wappingers Falls	97	42	71.8	4.15	
Warwick	.....	.....	.....	3.36	
Watertown	88	43	67.4	1.23	
Waverly	95	36	68.6	2.77	
Wedgwood	96	43	69.0	2.11	
West Berne	92	55	73.5	2.29	
Westfield *a*	93	46	68.6	2.42	
Westfield *b*	93	48	70.0	2.05	
Westfield *c*	90	46	69.4	2.11	
Westpoint	98	44	70.2	4.85	
Willetspoint	96	54	72.1	3.35	
Williamson	.....	.....	.....	1.26	
North Carolina.					
Abshers	98	46	74.2	4.85	
Asheville	.....	.....	.....	3.35	
Biltmore	93	45	72.7	4.05	
Bryson City	.....	.....	.....	3.90	
Chapel Hill	100	53	77.8	2.26	
Currituck Inlet	.....	.....	.....	3.49	
Durham[*b]	99	62	81.2	2.80	
Edenton	96	57	77.2	2.58	
Experimental Farm	98	56	77.8	3.98	
Fairbluff	.....	.....	.....	6.11	
Fayetteville	97	55	77.4	4.03	
Flatrock	88	44	70.6	4.26	
Goldsboro	102	54	78.4	2.41	
Greensboro	95	55	76.0	3.65	
Greenville	99	56	77.6	3.34	
Henderson	97		76.1	4.33	
North Carolina—Cont'd.					
Hendersonville	93	46	71.7	5.08	
Horse Cove	91	48	72.1	7.24	
Lenoir[*1]	88	53	74.2	4.52	
Linville	81	39	65.3	3.21	
Littleton	98	52	76.2	4.26	
Louisburg	98	53	77.1	4.04	
Lumberton	98	54	78.2	5.30	
Mana	.....	.....	.....	3.79	
Marion	95	51	74.8	5.76	
Marshall	94	48	74.0	3.87	
Mocksville	97	52	76.6	3.31	
Moncure	96	50	76.8	2.29	
Monroe	101	46	77.2	3.02	
Morganton	97	50	75.8	4.78	
Mountairy	94	48	73.4	6.44	
Mount Pleasant	97	51	78.2	3.36	
Murphy	.....	.....	.....	4.41	
Newbern	99	57	78.4	5.19	
Oakridge	100	53	76.4	2.68	
Pantego	.....	.....	.....	3.86	
Patterson[*1]	90	48	69.4	3.28	
Pittsboro	99	49	76.6	2.19	
Rockingham	102	50	78.7	4.29	
Roxboro	96	50	73.4	5.30	
Salisbury	101	52	78.0	3.08	
Saxon	98	48	74.5	5.15	
Selma	102	49	78.4	3.90	
Settle	98	49	76.2	0.84	
Sloan	97	55	77.8	7.93	
Soapstone Mount	100	53	75.6	2.93	
Southern Pines *a*	101	55	79.7	6.92	
Southern Pines *b*	100	52	80.0	6.76	
Southport	95	50	77.8	4.41	
Springhope[*1]	98	57	76.4	2.43	
Tarboro	103	51	78.2	4.77	
Waynesville	88	43	69.0	2.11	
Weldon *a*	96	55	76.5	3.06	
Weldon *b*	.....	.....	.....	3.21	
North Dakota.					
Amenia	93	40	64.5	3.27	
Ashley	88	38	62.2	4.33	
Berlin[1]	88[*]	38	58.3	3.16	
Bottineau	85	31	58.4	4.63	
Buxton	83[e]	41[e]	63.0[e]	2.85	
Churchs Ferry	93	41	62.8	3.74	
Coal Harbor	90	39	62.8	1.98	
Devils Lake	92	40	63.5	2.21	
Dickinson	90	38	61.8	2.59	
Donnybrook	90	32	62.6	2.90	
Dunseith	88	35	62.8	5.75	
Ellendale	95	38	65.1	3.20	
Fargo	88	38	63.8	3.44	
Forman	92	41	64.3	3.12	
Fort Berthold	92	35	61.1	8.08	
Fort Yates	96	43	65.6	5.64	
Fullerton[1]	91[*]	35	61.3	4.04	
Gallatin	95	36	62.1	2.22	
Glenullin	89	30	55.4	T.	
Grafton	84	39	62.0	2.44	
Hamilton	89	38	62.6	3.72	
Jamestown	90	38	62.4	2.10	
Langdon	87	35	58.2	4.30	
Larimore	90	39	62.0	1.82	
Lisbon	88	39	63.0	2.87	
McKinney	88	33	60.0	5.18	
Mayville	93	41	65.6	2.67	
Melville	92	37	62.4	2.02	
Milton	92	38	61.6	3.35	
Minnewaukon	90	36	62.8	2.49	
Minot	92	39	61.2	6.07	
Minto	90	38	64.0	3.09	
Napoleon	94	39	62.8	5.85	
New England City	94	36	58.6	1.40	
Oakdale	87	40	61.6	3.70	
Pembina	91	37	64.6	2.09	
Portal	85	33	59.7	4.55	
Power	84	37	61.0	4.14	
Sheyenne	.....	.....	.....	3.18	
Steele	95	39	61.4	3.96	
Towner	87	37	61.3	9.02	
Wahpeton	90	40	66.2	4.15	
Washburn	91	36	63.3	3.23	
Willow City	91	37	61.1	6.38	
Woodbridge	96	32	61.0	4.45	
Ohio.					
Akron	91	45	69.6	1.79	
Ashland	93	43	69.7	3.67	
Ashtabula	90	43	67.8	1.75	
Atwater	.....	.....	.....	2.15	
Bangorville	94	40	70.2	6.33	
Bellefontaine	93	46	72.4	1.09	
Bement	.....	.....	.....	1.33	
Benton Ridge	98	42	73.2	1.97	
Bethany	99	45	74.2	2.75	
Bigprairie	91	42	69.2	3.20	
Binola	.....	.....	.....	1.96	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Ohio—Cont'd.	°	°	°	*Ins.*	*Ins.*
Bladensburg	94	40	69.7	2.36	
Bloomingburg	96	45	73.4	1.11	
Bowling Green	96	41	70.4	2.33	
Bucyrus	98	46	71.8	2.95	
Cambridge	92	39	68.8	4.76	
Camp Dennison	95	49	74.8	3.74	
Canal Dover	95	40	70.8	2.89	
Canton	94	42	70.6	2.85	
Carrolton	95	38	70.6	3.92	
Cedarville				2.28	
Celina		39		1.67	
Chillicothe	97	48	72.6	4.31	
Circleville	95	47	71.2	4.10	
Clarksville	92	46	73.4	4.57	
Cleveland *a*	91	47	69.2	2.99	
Cleveland *b*	94	48	69.2	1.52	
Coalton	95	44	72.6	4.38	
Colebrook	92	37	67.6	2.40	
Dayton *a*	98	43	74.2	1.49	
Dayton *b*				1.41	
Defiance	96	42	71.8	1.64	
Delaware	96	40	71.8	2.85	
Demos	94	47	70.4	4.59	
Elyria	94	44	71.0	2.07	
Findlay	92	44	69.9	2.30	
Frankfort	91	45	71.4	3.49	
Garrettsville	93	37	67.5	2.57	
Granville	94	42	74.8	4.72	
Gratiot	92	42	71.2	4.12	
Greenfield	94[d]	51[d]	74.9[d]	3.60	
Greenhill	91	37	67.4	3.20	
Greenville	88	45	71.0	3.74	
Hackney	96	50	73.3	4.49	
Hanging Rock	96	47	74.2	2.76	
Hillhouse	94	37	66.6	3.03	
Hillsboro	91	46	73.3	6.09	
Hiram	91			2.03	
Hudson	94	40	68.4	1.98	
Jacksonboro	96	49	74.0	1.20	
Kenton	95	45	72.4	1.05	
Killbuck	91	42	69.9	2.82	
Lancaster	93	40	71.0	5.64	
Leipsic	103	50	73.2		
Levering	92	40	69.5	6.05	
Logan	98	52	72.8	5.73	
Lordstown	91	37	66.8	3.51	
Lowell	99	45	73.4		
McArthur	96	44	71.8	2.89	
McConnelsville	94	45	71.8	3.43	
Mansfield				6.42	
Marietta	92	49	73.6	5.82	
Marion	98	43	72.8	2.42	
Medina	93	40	69.2	1.06	
Milfordton	94	38	69.2	2.55	
Milligan	98	40	72.7	4.98	
Millport	90	38	67.9	2.77	
Montpelier	94	44	70.2	2.05	
Napoleon	97	41	70.8	1.51	
Neapolis				2.16	
New Alexandria	93	45	70.8	3.45	
New Berlin	95	40	69.6	2.61	
New Holland	96	45	73.1	2.27	
New Paris	91	46	72.4	1.87	
New Richmond	95	51	74.5	3.49	
New Waterford	93	43	69.6	3.20	
North Lewisburg	97	45	72.7	1.15	
North Royalton	94	44	69.8	1.22	
Norwalk	95	41	70.2	2.66	
Oberlin	97	41	70.0	1.46	
Ohio State University	95	43	72.6	2.05	
Orangeville	94	36	67.2	3.25	
Ottawa	96	41	72.0	1.65	
Pataskala	95	42	71.7	7.68	
Perry				3.39	
Philo	97	42	73.7	5.08	
Plattsburg	93	42	72.5	1.58	
Pomeroy	97	47	74.0	3.77	
Portsmouth *a*				4.75	
Portsmouth *b*	98	50	75.8	4.58	
Pulse				5.43	
Richwood	99	55	77.8	1.54	
Ridgeville Corners	95	44	72.0	2.01	
Ripley	96	48	73.8	4.46	
Rittman	92			1.04	
Rockyridge	97	44	71.4	2.05	
Rosewood	93	43	72.1	0.46	
Seaman	102	47	76.6	3.93	
Shenandoah	95	42	69.4	4.01	
Sidney	99	45	74.8	1.10	
Sinking Spring	92	48	72.4	3.92	
Somerset	93	52	75.0	5.92	
Springboro				3.52	
Strongsville				2.10	
Thurman	94	46	73.8	3.35	
Tiffin	94	45	71.8	2.10	
Upper Sandusky	97	42	71.9	2.55	
Urbana	91	45	71.9	1.04	
Vanceburg	96	47	73.6	3.90	
Vermillion	92	45	68.8	1.99	
Vickery	97	45	71.0	1.96	
Walnut				3.55	
Warsaw	98	39	72.2	3.44	
Wauseon	98	43	71.8	1.11	
Waverly	98	48	74.7	2.97	
Waynesville	94	44	72.2	2.92	
Wellington	94	43	70.6	1.91	
Westerville	91	46	70.8	2.81	
Willoughby				1.02	
Wooster	92	40	69.3	1.95	
Youngstown				2.98	
Zanesville				4.92	
Oklahoma.					
Arapaho	100	59	77.2	4.03	
Beaver	106	55	76.4	4.31	
Burnett	94	61	77.0	3.45	
Clifton	94	60	76.2	4.40	
Fort Reno	91	60	74.4	4.79	
Fort Sill	92	60	76.4	6.60	
Guthrie	94	64	77.1	4.04	
Hennessey	89	58	73.8	4.56	
Hopeton	95	60	75.6	8.26	
Jefferson				7.33	
Kingfisher	98	60	76.7	3.51	
Mangum	93	57	73.8	6.49	
Newkirk	98	56	75.1	4.73	
Norman	98	60	76.6	3.32	
Pawhuska	94	55	76.6	5.42	
Perry	94	55	75.2	4.03	
Prudence	95			4.51	
Putnam	93	41	70.8	4.52	
Sac and Fox Agency	93	57	75.5	4.65	
Stillwater	92	59	75.8	3.64	
Waukomis	97	56	75.9	5.49	
Winnview	95[f]	60[h]	75.3[e]	3.44	
Woodward	94	60	78.9	3.96	
Oregon.					
Albany *b*				0.64	
Arlington	91	43	64.8	0.09	
Ashland *b*	93	32	61.4	0.32	
Aurora	85	45	61.0	0.80	
Aurora (near)	84	33	57.4	0.87	
Bandon	65	45	54.0	1.57	
Bay City	75	35	54.9	3.51	
Beulah	98	28	60.4	0.38	
Blalock	94	45	68.8	0.33	
Brownsville[*1]	80	47	59.4	0.99	
Bullrun	78	41	55.8	2.69	
Burns (near)	90	27	59.2	0.00	
Cascade Locks	85	42	60.0	2.41	
Comstock[*1]	85	44	60.0	0.81	
Coquille River				0.61	
Corvallis	85	38	58.5	0.42	
Dayville	94	30	59.4	0.11	
Ella				0.08	
Fairview	80	34	55.7	1.23	
Falls City	83	35	57.5	0.97	
Gardiner	73	38	56.8	2.18	
Glenora	85	35	56.4	2.64	
Government Camp	76	27	45.9	3.68	4.0
Grants Pass	93	36	62.0	0.29	
Happy Valley	93	23	54.6	0.42	
Heppner	88	34	58.8	0.30	
Hood River (near)	85	38	58.4	1.66	
Jacksonville	89	35	61.2	0.40	
Joseph	84	26	53.0	1.44	0.2
Junction City[*1]	84	46	60.4	0.73	
Kerby	93	36	61.6	0.08	
Klamath Falls	94	32	62.0	0.02	
Lafayette[*1]	88	46	61.1	0.72	
Lagrande	91	36	59.0	0.57	
Lakeview	90	29	58.6	0.20	
Langlois	78	36	59.5	2.12	
Lonerock	87	22	51.8	0.31	
Lorella	94	26	58.7	0.10	
McMinnville	86	37	58.2	0.70	
Merlin[*1]	94	48	62.4	0.23	
Monmouth *a*[*1]	84	50	65.3	0.55	
Monmouth *b*	84	36	57.2	0.86	
Monroe	83	33	57.8	0.77	
Mount Angel	90	41	61.8		
Nehalem				2.28	
Newberg	88	34	59.2	0.76	
Newbridge	95	29	61.4	0.88	
Newport	63	40	52.0	1.44	
Pendleton	95	37	64.2	0.63	
Placer				0.66	
Prineville	96	24	57.2	0.03	
Riddles[*1]	88	43	61.4	0.20	
Salem *b*	84	32	59.0	0.25	
Sheridan[*1]	85	38	58.6	0.98	
Silver Lake	94	17	54.0	T.	
Silverton[*1]	88	52	63.5	0.61	
Oregon—Cont'd.	°	°	°	*Ins.*	*Ins.*
Siskiyou[*1]	90	36	63.8	0.10	
Sparta	85	28	54.7	1.80	T.
Springfield[*1]	81	42	61.4	0.67	
Stafford	86[e]	35[e]	57.7[e]	1.63	
The Dalles	90	40	63.7		
Tillamook Rock				1.87	
Toledo	78	36	55.0	2.15	
Umatilla				0.20	
Vale	96	29	62.4	0.31	
Vernonia	84	35	55.4	1.08	
Westfork[*1]	95	46	64.0	0.00	
Weston	87	34	58.8	0.82	
Williams	91	31	59.8	0.55	
Pennsylvania.					
Altoona	94	43	69.2	1.79	
Aqueduct	100	53	73.5	3.70	
Athens	98	37	68.8	1.93	
Beaver Dam				5.41	
Bethlehem				3.10	
Brookville				4.89	
Browers Lock				5.06	
Butler	91	38	68.4	3.96	
Carlisle	93	43	68.6	4.38	
Cassandra	89	43	67.6	3.88	
Centerhall	90	40	68.0	3.05	
Chambersburg	98			5.97	
Coatesville	99	51	73.4	2.20	
Confluence				4.18	
Coopersburg	91	50	71.3	3.17	
Davis Island Dam				4.72	
Derry Station	96	43	71.8	4.92	
Driftwood				3.35	
Duncannon				5.22	
Dushore	94	32	66.2	3.13	
East Bloomsburg				2.90	
East Mauch Chunk	98	41	70.8	4.14	
Easton	95	47	72.4	3.90	
Ellwood Junction				5.17	
Emporium	93	42	67.6	3.32	
Everett	93	45	70.4	2.91	
Farrandsville				3.83	
Forks of Neshaminy[*1]	94	60	73.6	1.74	
Franklin	92	36	68.0	3.00	
Frederick				3.11	
Freeport				3.54	
Girardville				5.40	
Grampian	92	46	68.6	3.00	
Greensboro	94	46	72.1	5.70	
Hamburg	96	46	72.5	5.25	
Hawley	94	36	68.5	5.50	
Hawthorn	93	39	69.1	4.88	
Hews Island Dam				3.25	
Huntingdon *a*	98	43	70.7	2.85	
Huntingdon *b*				2.43	
Irwin				4.72	
Johnstown	95	46	71.8	3.62	
Keating				2.85	
Kennett Square	98	49	72.6	2.94	
Lansdale				0.95	
Lawrenceville	95	45	67.9	3.78	
Lebanon	95	48	70.8	5.54	
Leroy	90	45	67.6	4.90	
Lewisburg	96	41	70.0	3.83	
Lock Haven *a*	97	46	72.5	4.47	
Lock Haven *b*				3.80	
Lock No. 4				2.39	
Lycippus		45		3.91	
Mifflin				3.10	
Nisbet				6.28	
Oil City				3.18	
Ottsville				1.70	
Parker				5.58	
Philadelphia	98	56	75.2	1.61	
Point Pleasant				2.11	
Quakertown	96	46	71.0	3.96	
Reading[2]			72.0	3.79	
Renovo *a*				2.87	
Renovo *b*	94	45	70.5	2.85	
Ridgway				3.68	
Saegerstown	90	36	67.0	2.14	
St. Marys		42		4.56	
Salem Corners	93	45	67.4	3.56	
Scranton	93	40	68.9	2.66	
Seisholtzville				4.68	
Selinsgrove *a*	95	45	70.4	4.04	
Shawmont				1.96	
Shinglehouse	94	34	67.4	3.61	
Sinnamahoning				1.23	
Smethport	90	36	65.4	2.68	
Smiths Corners				3.19	
Somerset	92	38	64.6	4.45	
South Eaton	91	42	68.4	2.58	
State College	90	45	69.2	2.41	
Sunbury				3.60	
Swarthmore	96	52	74.2	1.95	
Swiftwater	88	39	65.6	3.08	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Pennsylvania—Cont'd.	°	°	°	*Ins.*	*Ins.*
Towanda	94	38	68.6	4.52	
Uniontown	93	44	71.3	3.07	
Warren	90	39	66.2	2.58	
Wellsboro	93	38	68.1	4.09	
West Chester	95	54	73.0	1.96	
West Newton	.....	.....	.....	2.74	
White Haven	93	33	67.6	.....	
Wilkesbarre	101	42	73.0	2.82	
Williamsport	93	56	72.6	4.25	
York	96	47	71.8	3.54	
Rhode Island.					
Bristol	90	54	67.4	3.60	
Kingston	95	46	67.4	1.87	
Lonsdale	.....	.....	.....	3.16	
Pawtucket	92	57	69.6	3.55	
Providence *a*	94	55	72.2	3.62	
South Carolina.					
Allendale	101	60	80.0	3.18	
Anderson	.....	.....	.....	4.80	
Batesburg	102	55	80.4	3.50	
Beaufort	103	59	80.2	3.62	
Blackville	102	53	77.3	8.55	
Calhoun Falls	.....	.....	... .	2.75	
Camden	.....	.....	.... .	3.14	
Central[c]	99	54	79.3	1.98	
Cheraw *a*	101	54	80.0	3.52	
Cheraw *b*	.....	.....	.....	4.07	
Clemson College	99	53	78.2	3.52	
Conway	.....	.....	.....	7.45	
Darlington	.....	.....	.....	3.67	
Edisto	.....	. ....	.....	3.44	
Effingham	.....	.....	.....	2.81	
Florence	101	56	79.8	6.44	
Gaffney	.....	.....	.....	3.31	
Georgetown	98	58	80.2	3.00	
Greenville	94	53	76.4	2.31	
Greenwood	105	55	80.8	1.84	
Holland	97	52	76.6	4.67	
Kingstree *a*	100	52	80.4	4.72	
Kingstree *b*	.....	.....	.....	4.82	
Little Mountain	104	55	81.4	1.81	
Longshore	104	53	79.6	2.82	
Pinopolis[d1]	96	58	77.1	3.79	
St. Georges	99	55	79.7	4.46	
St. Matthews	98	57	79.6	6.59	
St. Stephens	.....	.....	.....	4.50	
Santuck	100	52	79.2	1.38	
Shaws Fork	103	48	78.2	5.62	
Smiths Mills	.....	.....	.....	3.49	
Society Hill	97	57	79.1	5.06	
Spartanburg	101	58	78.8	1.87	
Statesburg	99	55	79.5	6.31	
Summerville	98	54	78.0	5.39	
Temperance	104	51	79.5	5.77	
Trenton	99	57	81.0	4.80	
Trial	96	50	75.9	5.54	
Winnsboro	98	61	76.7	1.80	
Yemassee	104	58	81.4	5.04	
Yorkville	101	56	79.6	2.18	
South Dakota.					
Aberdeen	95	45	68.6	7.14	
Alexandria	95	41	69.4	4.86	
Armour	95	40	69.8	3.29	
Ashcroft	94	36	62.4	3.06	
Bowdle	92°	38°	62.6°	5.00	
Brookings	88	42	64.8	5.42	
Canton	92	.....	.....	4.46	
Centerville	.....	.....	.....	7.86	
Chamberlain	97	40	69.4	2.89	
Chandler	102	45	69.1	2.71	
Clark	.....	.....	.....	5.64	
Desmet	89	42	66.4	3.22	
Doland	98	36	66.4	4.00	
Elkpoint	93	48	70.2	4.13	
Farmingdale	.....	.....	.....	5.06	
Flandreau	94	45	66.6	3.87	
Forestburg	95	41	63.6	3.11	
Forest City	106	43	69.2	1.10	
Fort Meade	.....	47	. ...	2.35	
Gann Valley	98	40	69.2	3.45	
Gary	93	48	69.1	2.03	
Goudyville	94	38	65.2	3.84	
Highmore	98	44	69.1	4.20	
Hitchcock	.....	.....	.....	1.95	
Hotch City	.....	.....	.....	5.17	
Hot Springs	98	34	61.4	0.96	
Howard	90	40	67.1	3.96	
Interior	102	39	64.5	1.00	
Ipswich	94	42	65.0	5.12	
Kimball	96	40	68.8	3.13	
Leola	.....	.....	.....	3.52	
Leslie	108	38	67.0	2.53	
Mellette	95	39	66.8	2.49	
Menno	97	42	68.4	6.91	
Millbank	90	45	64.8	4.22	
Mitchell	94	41	67.0	4.94	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
South Dakota—Cont'd.	°	°	°	*Ins.*	*Ins.*
Montrose[d]	94	43	66.0	5.14	
Oelrichs	105	35	66.1	1.40	
Parker	92	42	68.0	5.31	
Plankinton	96	40	68.5	3.11	
Redfield	94	41	66.0	2.72	
Rochford	92	25	55.6	2.38	
St. Lawrence	94	40	66.6	3.19	
Shiloh	102	40	65.4	2.55	
Silver City	.....	.....	.....	2.02	
Sioux Falls	93	41	66.2	6.91	
Spearfish	90	38	60.2	2.53	
Tyndall	97	36	69.2	4.34	
Watertown	87	40	63.8	2.85	
Waubay	92	44	66.2	3.85	
Wentworth	90	45	66.1	4.92	
Wessington Springs	93	40	62.6	2.78	
Whiteswan	102	44	70.4	1.85	
Wolsey	.....	.....	.. ...	1.82	
Tennessee.					
Andersonville	93	46	74.2	4.33	
Arlington	.....	.....	.....	1.75	
Ashwood	100	48	79.2	1.74	
Benton (near)	98	50	77.6	1.19	
Bluff City	.....	.....	.....	5.63	
Bolivar	96	51	77.1	3.19	
Bristol	90	51	72.8	2.83	
Brownsville	98	53	78.6	2.15	
Byrdstown	95	46	75.6	3.35	
Carthage	101	59	78.6	1.09	
Clarksville	95	51	76.4	1.05	
Clinton	.....	.....	.....	5.36	
Covington	97	55	80.0	1.27	
Decatur	96	48	76.6	4.88	
Dover	105	47	78.0	3.02	
Dyersburg	99	53	79.2	2.90	
Elizabethton	97	45	74.4	2.75	
Elk Valley	.. ...	.....	.....	2.72	
Erasmus	93	36	70.8	5.34	
Florence	97	54	79.2	1.32	
Franklin	99	49	77.6	1.00	
Grace[d1]	100	50	79.4	5.21	
Greeneville	93	46	73.6	2.55	
Harriman	94	49	76.2	4.67	
Hohenwald	98	44	75.1	1.47	
Jackson	95[d]	60[d]	78.4[d]	2.41	
Johnsonville	97	46	75.8	1.50	
Jonesboro[d1]	90	46	73.4	5.20	
Kingston	.....	.....	.....	5.07	
Lafayette[d5]	96	57	77.0	1.27	
Lewisburg	98	47	78.2	0.72	
Lynnville	98	51	78.5	1.28	
McKenzie	97	53	77.6	1.19	
Madison	102	42	77.9	0.12	
Maryville[d5]	96	50	76.4	3.01	
Milan	100	52	79.4	2.63	
Newport	95	49	75.8	3.64	
Nunnelly	98	45	75.4	2.21	
Oak Hill	95	49	75.6	2.92	
Palmetto	101	45	78.3	3.07	
Peryear[d5]	99	53	77.3	2.13	
Pope	101	44	75.8	2.87	
Rogersville	90	48	73.2	3.41	
Rugby	92	40	72.8	3.03	
Savannah	99	49	78.4	1.43	
Sewanee	92	53	74.4	4.07	
Silverlake	88	41	68.6	4.99	
Springdale	96[d]	43[d]	75.4[d]	6.14	
Springfield[c]	101	56	78.2	0.50	
Tazewell	.....	.....	.....	3.30	
Tellico Plains	96	50	76.4	4.08	
Tracy City	92	44	72.5	3.55	
Trenton	97	55	79.0	2.11	
Tullahoma	96	46	75.0	2.50	
Union City	94	52	77.0	0.20	
Waynesboro	98	45	76.8	0.35	
Wildersville	93	53	76.4	4.65	
Yukon	100	51	78.4	2.21	
Texas.					
Albany[d1]	92	62	76.7	4.84	
Alvin	.....	.....	.....	8.51	
Anna	96	56	77.8	3.86	
Anson	.....	.....	.....	6.30	
Arthur	.....	.....	.....	3.87	
Austin *a*	96	60	78.9	3.80	
Austin *b*[d5]	93	60	77.2	.....	
Ballinger	92	60	76.0	7.27	
Beaumont	100	68	83.6	3.70	
Beeville	99	61	80.9	3.70	
Blanco	96	60	77.2	3.25	
Boerne[d1]	95	64	77.4	4.96	
Brazoria	94	63	79.4	10.32	
Brenham	95	63	80.1	22.01	
Brighton	96	70	82.4	2.16	
Brownwood	99	60[f]	79.0°	7.50	
Burnet[d1]	94	59	77.0	5.61	
Camp Eagle Pass	102	65	81.4	13.50	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Texas—Cont'd	°	°	°	*Ins.*	*Ins.*
Childress	94	56	76.3	8.46	
Coleman	93	52	73.3	6.15	
College Station[d5]	.....	.....	81.0	.....	
Colorado	.....	.....	.....	4.04	
Columbia	91	62	78.6	10.56	
Conroe	96	61	80.2	8.03	
Corsicana	100	63	82.4	6.76	
Cuero	97	57	82.0	18.82	
Dallas	97	61	79.3	6.58	
Danevang	102	63	82.0	14.73	
Desdimonia	100[b]	63°	81.2°	9.93	
Dublin	95	59	76.4	7.80	
Duval	94	64	79.3	4.27	
Emory	100	51	80.0	4.77	
Estelle	98	61	80.0	6.66	
Fort Brown	94	67	82.0	2.39	
Fort Clark	98	62	79.1	22.32	
Fort McIntosh	102	69	84.2	7.67	
Fort Ringgold	100	65	82.8	3.22	
Fort Stockton	.....	.....	.....	0.68	
Fredericksburg[d1]	90°	61	78.7°	10.03	
Fruitland	96	62	76.4	5.24	
Gainesville	93	61	78.2	6.83	
Georgetown[d5]	98	64	80.6	7.23	
Golindo	.....	.....	.....	20.40	
Grapevine	96	61	79.1	5.61	
Hale Center	93	60	73.0	6.64	
Hallettsville	99	62	81.5	13.43	
Hearne	96	68	83.2	.....	
Henrietta	96	64	78.6	3.96	
Hewitt	.....	.....	.....	19.25	
Hondo	.....	.....	.....	9.41	
Honeygrove	.....	.....	.....	2.60	
Houston	94	66	79.8	9.26	
Hulen	.....	61	.....	5.14	
Huntsville	95	60	80.3	9.42	
Jacksonville	94	55	78.8	3.07	
Jasper	96	57	79.6	3.26	
Junction	.....	.....	.....	9.01	
Kent	.....	.....	.....	1.85	
Kerrville	95	66	75.8	9.66	
Lampasas	98	58	78.3	7.69	
La Parra	.....	.....	.....	1.40	
Laureles Ranch	.....	.....	.....	3.22	
Llano[d5]	95	68	80.1	3.12	
Longview	99	61	81.8	4.94	
Luling	96	62	81.1	4.26	
Mann	101	62	78.6	11.00	
Marathon	98	.....	.....	0.35	
Monahans	.....	.....	.....	0.82	
Mount Blanco	92	55	73.8	7.25	
New Braunfels	98	61	81.2	5.21	
Panter	.....	.....	.....	11.06	
Paris *a*	95	60	78.6	1.17	
Paris *b*[c]	93	60	82.9	.....	
Point Isabel[d1]	93	78	83.0	0.90	
Rhineland	97	62	77.6	7.02	
Roby	93	55	73.9	3.81	
Rock Island	.....	.....	.....	12.07	
Rockport[d1]	88	65	79.6	.....	
Rocksprings	.....	.....	.....	11.10	
Runge	98	64	82.9	4.13	
Sabine Pass	.....	.....	.....	3.67	
Sanderson	.....	65	... .	2.55	
San Marcos	93	59	77.0	5.32	
Sherman	96	63	79.6	4.76	
Sugarland	106	66	84.4	12.68	
Sulphur Springs	93°	60°	79.0°	3.29	
Temple *a*	94	64	79.0	10.97	
Temple *b*	96	62	78.2	11.49	
Tulia	95	52	72.6	4.44	
Tyler	96	63	81.6	3.88	
Valentine	102	.....	.....	1.30	
Victoria	.....	.....	.....	6.91	
Waco	98	64	83.1	11.55	
Waxahachie	99	58	79.9	7.85	
Weatherford	99	59	80.0	7.39	
Wichita Falls	.....	.....	.....	6.89	
Utah.					
Bluecreek[d1]	97	40	64.5	0.43	
Brigham	.....	.....	.....	0.19	
Castledale	94[f]	37	66.4°	0.29	
Cisco	103	40	70.8	0.52	
Corinne	97	29	63.8	0.21	
Croydon	91	24	55.2	1.10	
Fillmore	101	32	65.6	0.96	
Fort Duchesne	97	36	64.6	0.05	
Frisco	96	36	66.8	0.36	
Giles	107	41	71.8	0.72	
Grover	93	30	60.6	0.91	
Heber	96	30	59.7	0.97	
Huntsville	.....	.....	.....	0.19	
Kelton[d1]	100	50	68.8	0.00	
Levan	95	30	61.8	0.95	
Loa	97	27	60.1	0.42	
Logan	93	30	62.6	0.60	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Utah—Cont'd.	°	°	°	*Ins.*	*Ins.*
Manti	98	34	65.0	.....	
Marysvale [*3]	.....	36	53.5	0.12	0.3
Millville	.....	.....	.....	0.86	
Minersville	100	35	66.8	0.17	
Moab	107	42	73.4	0.76	
Mount Pleasant	99	33	65.4	0.99	
Ogden *a* [*1]	96	40	66.0	0.98	
Pahreah	102	45	71.9	1.00	
Parowan	96	36	64.8	0.82	
Pinto	94	30	61.4	0.77	
Promontory [*1]	100	43	63.5	0.60	
Richfield	92	.....	.....	0.14	
St. George	110	41	74.1	0.28	
Scipio	96	25	62.3	0.43	
Snowville	94	21	57.3	0.00	
Soldier Summit	97	.....	.....	0.44	
Terrace [*1]	90	32	56.6	0.00	
Thistle	.....	.....	.....	T.	
Tooele	96	34	64.4	2.43	
Tropic	97	29	61.8	0.69	
Vernal	92	36	65.2	0.78	
Woodruff	86	21	53.2	0.24	
Vermont.					
Bennington	92	42	67.8	5.96	
Brattleboro	94	41	67.2	5.23	
Burlington	89	52	69.3	2.43	
Chelsea	86	39	63.4	1.44	
Cornwall	95	42	68.1	1.60	
Derby	86	40	63.0	2.22	
Hartland	88	35	63 2	2.16	
Jacksonville	89	34	65.0	4.25	
Norwich	90	35	63.2	3.53	
St. Johnsbury	87	37	64.6	2.09	
Vernon [*6]	93	56	70.1	5.35	
Wells	92	44	67.0	2.23	
Woodstock	88	37	64.0	2.02	
Virginia.					
Alexandria	98	53	75.8	3.72	
Ashland	101	53	76.6	2.38	
Barboursville	96	52	74.8	2.80	
Bedford City	98	51	75.6	5.76	
Bigstone Gap	94	43	72.9	2.70	
Birdsnest [*1]	98	63	75.6	3.35	
Blacksburg	91	45	69.3	7.31	
Buckingham	96	47	73.5	3.29	
Burkes Garden	87	40	65.7	5.61	
Callaville	94	56	74.4	2.48	
Charlottesville	94	52	74.0	3.30	
Christiansburg	.....	.....	.....	4.52	
Clarksville	.....	.....	.....	4.33	
Clifton Forge	95	50	67.1	1.65	
Columbia	.....	.....	.....	2.25	
Dale Enterprise	97	41	71.0	1.86	
Danville	.....	.....	.....	6.24	
Doswell	106	47	75.5	2.22	
Farmville	100	55	76.8	4.61	
Fontella	99	53	75.8	.....	
Fredericksburg	96	54	75.4	3.40	
Grahams Forge [*1]	89	45	69.6	6.37	
Hampton	96	61	77.4	3.78	
Hot Springs	88	45	69.2	7.60	
Lexington	91°	49°	72.4°	2.62	
Manassas	97	53	74.6	1.11	
Marion	92	43	71.0	5.96	
Miller School	97	49	73.3	2.37	
Newport News	99	60	79.6	4.47	
Petersburg	99	54	77.2	3.07	
Quantico	96	54	74.8	.....	
Radford	.....	.....	.....	2.50	
Richmond (near)	97	52	75.3	2.83	
Rockymount	96	53	75.9	5.56	
Salem	92	55	74.4	3.27	
Speers Ferry	.....	.....	.....	4.78	
Spottsville	100	50	76.6	4.09	
Stanardsville	96	52	73.6	2.74	
Staunton	96	44	73.7	1.39	
Stephens City	95	49	73.5	2.58	
Sunbeam	96	51	75.5	4.77	
Warrenton	97	51	75.4	2.01	
Warsaw	96°	55°	76.0°	3.79	
Westbrook	98	54	77.2	.....	
Woodstock	96	47	73.2	1.98	
Wytheville	91	47	70.6	6.03	
Washington.					
Ashford	.....	.....	.....	2.75	
Bridgeport	92	39	65.0	0.10	
Brinnon	75	40	55.8	1.74	
Cedar Lake	.....	.....	.....	5.81	
Cedonia	80	32	53.8	1.04	
Centerville	90	32	58.2	0.05	
Chehalis	85	36	57.1	.....	
Cheney	.....	.....	.....	0.10	
Clearwater	76	38	54.2	3.11	
Cle Elum	81	32	53.6	1.03	T.
Colfax	84	36	58.2	0.98	T.
Connell	.....	.....	.....	0.06	

Stations	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Washington—Cont'd.	°	°	°	*Ins.*	*Ins.*
Coupeville	70	37	53.9	0.87	
Crescent	87	37	59.5	0.35	
Ellensburg	84	36	58.3	0.19	
Ellensburg (near)	90	38	60.5	0.04	
Fort Simcoe	89	36	61.3	0.13	
Grandmound	82	36	57.6	1.03	
Hooper	91	38	62.1	0.32	
Kennewick	97	42	68.0	0.13	
Lacenter	85	36	58.2	0.90	
Lakeside	86	39	63.4	0.17	
Lind	96	35	64.4	0.40	
Mayfield	82	35	57.6	1.50	
Montecristo	70	31	47.6	5.38	2.0
Moxee Valley	91	37	62.4	0.01	
New Whatcom	69	38	53.3	0.65	
Northport	92	37	62.2	1.89	
Olga	72	39	54.7	0.38	
Olympia	83	36	57.4	1 23	
Orcas Island	74	44	57.0	0 66	
Pinehill	89	40	60.4	0.35	
Pomeroy	88	41	66.0	0.49	T.
Port Townsend	68	40	54.0	0.98	
Pullman	87	33	56.7	1.53	1.5
Ritzville	.....	.....	.....	0.29	
Rosalia	81	34	56.0	0.62	
Sedro	77	38	56.8	2.42	
Silvana	74	35	53.6	1.67	
Snohomish	74	38	57.0	2.50	
Snoqualmie	77	40	58.2	3.56	
Southbend	77	36	54.3	2.74	
Sprague	.....	.....	.....	T.	
Sunnyside	90	36	64.2	0.11	
Union City	79	36	57.5	1.50	
Usk	90	37	59.8	3.87	
Vancouver	81	36	58.1	1.20	
Vashon	75	38	56.6	1.52	
Waterville	85	33	59.6	0.65	
Wenatchee (near)	85	37	60.2	0.34	
West Virginia.					
Beckley [1]	89	42	68.6	4.08	
Beverly	95	43	70.8	5.54	
Bluefield	89	44	69.1	5.34	
Buckhannon *a*	.....	.....	.....	6.33	
Buckhannon *b*	93	44	70.2	.....	
Burlington	95	45	71.1	3.72	
Cairo	96	44	72.4	7.13	
Charleston	.....	.....	.....	4.94	
Dayton	93	44	70.5	4.17	
Eastbank	.....	.....	.....	3.86	
Elkhorn	91	45	70.4	5.11	
Fairmont	.....	.....	.....	5.59	
Glenville	90	48	71.0	6.50	
Grafton	92	44	70.1	6.33	
Green Sulphur	90	40	72.0	6.32	
Harpers Ferry	.....	.....	.....	2.51	
Hinton *a*	.....	.....	.....	4.68	
Hinton *b*	95	47	73.4	.....	
Huntington	96	49	74.7	1.46	
Kingwood	91	42	69.8	8.64	
Madison	.....	.....	.....	2.51	
Marlinton	89	40	69.0	1.92	
Martinsburg	94	51	72.4	3.32	
Morgantown	97	45	71.4	6.43	
New Cumberland	98	44	72.9	6.58	
New Martinsville	97	47	72.8	3.57	
Nuttallburg	91	42	70.4	4.48	
Oceana	95	46	71.9	8.93	
Oldfields	95	42	70.7	3.57	
Parsons	94	45	69.2	3.47	
Philippi *a*	93	44	71.2	4.42	
Philippi *b*	.....	.....	.....	4.53	
Point Pleasant	97	49	73.5	4.95	
Powellton	90	45	69.8	4.76	
Romney	95	49	72.4	3.81	
Rowlesburg	.....	.....	.....	7.69	
Terraalta	.....	.....	.....	8.19	
Upper Tract	98	38	71.2	4.04	
Weston *a*	.....	.....	.....	5.65	
Weston *b*	98	46	73.1	.....	
Wheeling *a*	.....	.....	.....	4.35	
Wheeling *b*	97	50	75.5	4.76	
Wisconsin.					
Amherst	86	43	65.9	6.80	
Antigo	87	37	64.4	.....	
Bayfield	83	38	61.1	4.37	
Beloit	89	45	69.9	2.53	
Brodhead	93	42	69.6	2.02	
Chilton	87	44	67.7	5.72	
Citypoint	89	42	67.8	11.37	
Delavan	94	43	71.0	2.52	
Dodgeville	91	43	68.2	4.99	
Easton	90	38	67.6	7.03	
Eau Claire	88	45	67.1	7.02	
Florence	83	35	61.1	4.26	
Fond du Lac	90	41	67.6	5.35	
Grand River Locks	.....	.....	.....	7.55	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Wisconsin—Cont'd.	°	°	°	*Ins.*	*Ins.*
Grantsburg	90	34	62.6	2.30	
Hartford	91	39	68.7	2.77	
Hartland	87	40	67.6	3.92	
Harvey	89	43	68.4	3.43	
Hayward	88	36	63.8	4.60	
Heafford Junction	87	40	65.1	4.96	
Hillsboro	90	39	66.9	9.24	
Knapp	87	42	65.2	8.37	
Koepenick [*1]	86	46	68.6	4.80	
Lancaster	91	45	69.6	.....	
Lincoln	88	39	64.6	6.48	
Madison	88	49	68.8	2.64	
Manitowoc	84	43	61.8	2.76	
Meadow Valley	89	41	66.2	7.36	
Medford	.....	.....	.....	5.90	
Menasha	.....	.....	.....	4.98	
Neillsville	86	40	65.8	7.32	
New Holstein	90	40	64.5	3.15	
New London	89	43	66.4	7.07	
Oconto	89	42	65.8	4.08	
Osceola	86	37	63.8	6.85	
Pepin	89	44	68.4	6.09	
Pine River	88	41	66.1	6.74	
Portage	92	47	69.6	8.97	
Port Washington	91	40	64.1	2.42	
Prairie du Chien	94	48	71.4	7.23	
Prentice [*1]	85	38	60.5	7.75	
Racine	91	43	66.6	3.17	
Sharon	91	44	69.8	1.61	
Shawano	89	38	64.6	4.96	
Spooner	93	31	63.8	2.89	
Stevens Point	86	43	66.2	7.48	
Valley Junction	88	44	66.7	7.39	
Viroqua	88	44	66.4	8.68	
Watertown	89	43	68.2	4.39	
Waukesha	88	45	68.0	3.99	
Waupaca	89	42	66.8	7.80	
Wausau	84	40	65.7	6.77	
West Bend	90	44	68.7	1.87	
Westfield	90	44	68.2	6.38	
Whitehall	88	42	67.8	7.14	
Wyoming.					
Alcova	97	20	56.4	1.38	
Basin	102	33	68.3	0.53	
Big Piney	81	21	50.8	0.35	
Bitter Creek	103	25	60.1	4.21	
Buffalo	94	34	60.0	2.94	
Burns	87	17	50.2	0.81	
Carbon	103	26	57.0	1.69	
Centennial	78	26	52.1	0.91	
Cody	96	33	62.2	0.68	
Douglas	96	31	60.8	2.63	
Embar	96	30	60.6	.....	
Evanston	84	20	53.6	0.18	
Fort Laramie	100	36	64.0	1.94	
Fort Washakie	90	20	57.4	0.81	
Fort Yellowstone	82	26	53.0	1.90	
Four Bear	84	26	51.2	2.70	T.
Hecla	92	32	58.8	1.56	
Hyattsville	94	32	61.4	.....	
Laramie	87	29	55.1	1.11	
Lovell	101	31	64.2	1.22	
Lusk	100	33	62.0	2.76	
Rawlins	89	31	56.6	2.17	
Rocksprings	93	14	54.2	5.50	
Sheridan	93	32	58.4	2.14	
Thayne	85	21	54.0	1.01	.....
Thermopolis	100	33	61.6	.....	
Wamsutter	87	30	56.0	2.97	T.
Wheatland	100	35	61.3	2.63	
Mexico.					
Ciudad P. Diaz	98	71	82.5	10.32	
Coatzacoalcos [*2]	.....	.....	81.0	.....	
Leon de Aldamas	89	53	69.8	4.25	
Puebla	78	51	63.7	7.93	
Tampico [*2]	.....	.....	81.0	.....	
Vera Cruz [*2]	.....	.....	82.7	.....	
New Brunswick.					
St. John	76	45	55.8	1.76	
Porto Rico.					
Adjuntas	90	58	73.0	13.85	
Aguadilla	87	75	80.8	7.40	
Arecibo	87	62	74.4	6.40	
Bayamon	94	60	78.6	15.59	
Caguas	95	65	79.0	6.93	
Canovanas	85	72	78.0	8.01	
Cayey	91	63	77.0	5.00	
Corozal	92	63	77.7	13.50	
Fajardo	88	71	80.0	5.88	
Isabela	94	67	80.8	2.34	
Loiza	89	72	80.2	4.04	
Los Banos	94	63	78.4	5.27	
Luquillo	87	69	78.2	11.17	
Manati	86	66	74.8	4.24	
Maunabo	88	74	81.8	.....	
Morovis	88	65	76.6	2.54	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Porto Rico—Cont'd	°	°	°	*Ins.*	*Ins.*
Puerta de Tierra	91	71	80.4	5.91	
San Lorenzo	86	71	79.4	.....	
Utuado	91	63	76.5	4.71	
Vieques	90	68	79.4	5.68	
Yanco	91	63	78.7	3.50	
Late reports for May, 1899.					
Alaska.					
Juneau	69	29	44.3	4.68	.....
Skaguay	78	25	47.1	1.07	.....
Tyoonok	60	30	43.1	1.05	4.0
Iowa.					
Fayette	82	33	58.7	6.69	
Kansas.					
Ulysses	101	29[7]	66.8[8]	0.20	
Massachusetts.					
Lowell *a*	89	32	58.0	2.10	
Lowell *b*	89	34	57.1	.....	
North Carolina.					
Greenville	92	46	69.4	3.27	
South Dakota.					
Gary	80	29	59.2	5.17	
Rosebud	83[9]	30[9]	57.4[9]	1.74	
Texas.					
Valentine	98	42	69.8	0.00	

EXPLANATION OF SIGNS.

• Extremes of temperature from observed readings of dry thermometer.

A numeral following the name of a station indicates the hours of observation from which the mean temperature was obtained, thus:

[1] Mean of 7 a. m. + 2 p. m. + 9 p. m. + 9 p. m. + 4.
[2] Mean of 8 a. m. + 8 p. m. + 2.
[3] Mean of 7 a. m. + 7 p. m. + 2.
[4] Mean of 6 a. m. + 6 p. m. + 2.
[5] Mean of 7 a. m. + 2 p. m. + 2.
[6] Mean of readings at various hours reduced to true daily mean by special tables.
[7] Mean from hourly readings of thermograph.
[9] Mean of sunrise and noon.
[10] Mean of sunrise, noon, sunset, and midnight.

The absence of a numeral indicates that the mean temperature has been obtained from daily readings of the maximum and minimum thermometers.

An italic letter following the name of a station, as "Livingston *a*," "Livingston *b*," indicates that two or more observers, as the case may be, are reporting from the same station. A small roman letter following the name of a station, or in figure columns, indicates the number of days missing from the record; for instance, "*a*" denotes 14 days missing.

No note is made of breaks in the continuity of temperature records when the same do not exceed two days. All known breaks, of whatever duration, in the precipitation record receive appropriate notice.

CORRECTIONS.

Table I, May, 1899, Bridgetown, Barbados, West Indies, make mean temperature 79.7 instead of 49.7.

Nebraska, Weeping Water, April, 1899, make total precipitation 3.05 instead of 2.49.

TABLE III.—*Mean temperature for each hour of seventy-fifth meridian time, June*, 1899.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midn't.	Mean.
Bismarck, N. Dak....	59.0	58.1	57.0	55.8	54.9	54.5	54.8	57.2	58.9	62.0	64.3	66.5	68.7	70.0	71.2	71.9	72.5	72.6	71.8	70.7	68.2	64.2	62.0	60.5	63.6
Boston, Mass	64.6	63.7	62.9	62.2	61.3	61.8	64.5	67.3	70.2	72.5	73.9	74.8	75.4	75.4	75.5	75.4	74.4	73.3	71.5	70.3	68.9	67.7	66.5	65.5	69.1
Buffalo, N. Y.....	64.3	63.8	63.1	62.3	61.9	62.7	63.8	65.3	66.4	67.3	68.5	69.5	70.0	70.5	70.7	70.7	70.3	70.1	69.3	68.3	67.1	66.5	65.9	64.9	66.8
Chicago, Ill.....	67.2	66.7	65.9	65.5	65.0	65.1	65.6	67.6	68.8	70.3	71.0	71.6	72.7	73.4	73.6	73.8	73.2	73.0	72.3	71.1	69.9	69.1	68.5	68.2	69.5
Cincinnati, Ohio....	70.5	69.5	68.5	67.6	66.7	66.3	67.2	70.0	72.0	74.3	76.6	78.5	79.4	80.7	81.8	82.6	83.0	82.4	80.7	79.0	77.4	75.1	73.0	71.6	74.8
Cleveland, Ohio	65.8	65.0	63.7	63.2	62.1	62.7	64.5	66.5	68.2	70.1	71.6	71.5	72.2	72.6	73.4	74.0	74.9	74.1	73.2	72.6	70.7	69.2	67.5	66.0	69.0
Detroit, Mich.....	64.9	64 2	63.6	63.0	62.7	62.4	63.3	66.0	68.0	69.8	71.4	72.7	73.5	74.5	75.4	75.9	74.9	75.3	74.6	72.2	69.1	67.7	66.7	65.7	69.1
Dodge, Kans.....	67.0	66.9	65.8	64.9	64.3	63.5	63.1	64.8	67.3	70.0	73.1	75.9	78.4	80.3	82.3	82.7	82.8	81.9	79.8	77.9	74.6	71.5	69.5	68.6	72.4
Eastport, Me.....	51.9	51.3	51.2	50.6	50.1	50.5	51.6	53.2	55.3	56.3	58.0	58.4	59.9	60.2	60.7	60.6	60.1	59.0	56.8	55.0	54.2	53.5	52.8	52.6	55.2
Galveston, Tex.....	79.1	78.9	78.6	78.4	78.1	78.0	78.1	78.7	79.4	79.9	80.9	81.8	82.2	83.2	83.0	82.7	82.7	81.9	81.6	81.1	80.3	80.0	79.8	79.5	80.3
Havre, Mont.....	55.2	53.6	51.8	51.4	50.6	50.2	50.2	51.5	53.4	55.8	58.5	61.0	63.5	65.5	66.5	67.1	67.6	67.9	67.0	66.4	65.9	63.9	59.6	57.1	59.2
Independence, Cal..	73.8	71.3	69.7	68.3	66.8	66.0	64.7	63.3	65.1	68.0	72.3	75.5	79.1	81.5	83.9	85.1	85.9	86.2	86.3	85.7	83.8	80.7	78.5	76.5	75.8
Kansas City, Mo.....	70.7	70.1	69.6	68.7	68.2	67.7	67.7	69.1	71.6	73.6	75.8	77.5	79.0	80.3	80.7	80.8	80.8	80.6	79.9	78.1	75.5	74.2	73.0	71.8	74.4
Key West, Fla.....	79.8	79.6	79.6	79.5	79.4	79.5	80.8	81.7	82.6	83.1	83.8	83.5	84.2	83.7	83.6	83.5	82.9	82.4	81.5	80.9	80.6	80.3	80.4	79.9	81.5
Marquette, Mich	57.0	56.5	55.6	55.1	54.7	55.2	57.6	60.4	62.0	62.5	63.9	63.7	64.2	64.2	63.7	64.0	63.8	64.0	61.9	61.4	60.2	59.3	58.3	58.1	60.3
Memphis, Tenn.....	75.3	74.6	73.6	73.2	72.5	72.0	72.5	73.8	76.3	78.1	80.0	81.7	83.5	84.3	84.7	85.0	85.1	84.5	82.9	81.7	79.1	78.0	76.9	76.1	78.6
Mt. Tamalpais, Cal..	65.1	64.2	63.9	64.3	63.9	63.0	62.6	62.7	62.8	63.3	64.3	65.0	66.3	67.6	69.2	70.6	71.3	71.6	71.5	70.4	69.6	68.1	66.9	66.6	66.4
New Orleans, La.....	76.1	75.8	75.4	75.2	75.0	74.7	74.7	76.9	78.5	79.9	82.1	83.4	83.8	83.0	84.2	84.3	83.1	82.8	81.6	80.5	79.3	78.0	77.2	76.7	79.3
New York, N. Y.....	67.3	66.5	65.9	65.4	65.2	65.6	67.1	69.0	70.9	73.6	76.0	77.5	78.4	78.2	78.4	78.6	77.5	76.1	74.3	73.2	71.6	70.3	69.3	68.6	71.9
Philadelphia, Pa.....	69.2	68.6	67.9	67.1	66.9	67.6	69.8	72.5	74.8	76.9	78.5	79.9	81.4	82.5	82.7	82.8	81.5	80.0	77.9	76.2	73.3	72.0	71.0	70.0	74.6
Pittsburg, Pa.....	67.2	66.5	65.7	65.0	63.7	63.6	65.0	67.9	70.8	73.7	76.1	77.4	77.7	78.9	79.3	80.0	79.8	78.1	75.9	74.8	73.2	71.2	69.7	68.0	72.1
Portland, Oreg.....	58.7	57.6	56.5	55.0	53.9	53.0	51.8	51.0	51.0	52.3	54.1	55.9	57.6	59.1	60.9	62.5	64.3	65.1	65.9	65.7	65.6	64.5	62.6	60.5	58.5
St. Louis, Mo.....	73.8	73.2	72.2	71.4	70.1	69.7	70.4	72.2	74.7	77.0	79.4	81.2	82.5	82.7	83.5	83.6	83.3	82.9	82.1	80.6	78.9	77.6	75.8	74.7	77.2
St. Paul, Minn.....	64.2	63.2	62.4	61.8	61.1	60.6	60.7	62.1	63.8	65.5	67.4	68.9	70.3	71.6	72.2	73.0	73.9	74.4	72.8	71.2	70.5	68.8	67.1	65.9	67.2
Salt Lake City, Utah.	62.0	60.8	59.7	58.5	57.0	56.5	55.1	57.3	58.1	61.1	65.1	67.9	69.4	71.9	73.2	74.2	75.1	75.4	75.4	74.3	72.9	69.5	65.7	63.4	65.8
San Diego, Cal.....	60.0	59.8	59.5	59.2	59.0	58.8	58.7	58.3	58.3	58.7	59.5	60.7	62.1	63.0	63.6	63.9	63.8	63.8	63.5	63.2	62.6	61.9	60.9	60.4	61.0
San Francisco, Cal...	53.0	52.8	52.1	51.8	51.8	51.5	51.4	51.9	51.6	53.3	55.2	57.6	59.9	61.1	61.7	61.2	61.3	60.4	59.4	58.0	57.1	55.9	54.1	53.4	55.7
Santa Fe, N. Mex ...	60.8	59.8	58.8	57.1	55.5	54.7	52.6	55.0	60.2	62.9	65.0	67.5	69.8	71.3	72.5	74.0	73.5	72.9	73.1	71.6	69.8	65.8	63.4	62.4	64.6
Savannah, Ga.....	75.1	74.6	73.9	73.4	72.9	72.9	74.7	77.7	80.9	83.4	85.8	87.0	87.7	87.2	86.7	86.1	84.0	82.4	79.9	78.6	77.1	76.8	75.8	75.3	79.6
Washington, D. C....	69.3	68.6	67.6	66.7	65.9	66.1	68.7	72.2	74.4	76.4	78.3	79.8	80.6	81.5	81.8	82.2	82.2	81.3	78.9	76.3	74.0	72.6	70.8	69.8	74.4
West Indies.																									
Basseterre, St. Kitts.	76.9	76.9	76.8	76.5	77.1	78.4	80.0	81.6	82.4	83.4	83.7	84.2	83.9	83.3	82.3	81.7	79.8	78.8	78.6	78.8	77.9	77.4	77.5	76.9	79.8
Bridgetown, Bar.....	76.0	75.8	75.6	75.7	76.0	78.4	80.6	82.7	83.2	83.7	84.7	84.5	84.2	83.9	82.2	82.0	80.3	79.1	78.2	78.1	77.3	76.6	76.5	76.1	79.6
Cienfuegos, Cuba ...	73.2	72.7	72.1	72.1	71.9	72.9	76.7	80.1	82.5	84.4	85.9	86.6	86.1	84.6	82.3	81.5	80.5	79.5	77.7	77.0	76.3	75.7	74.7	74.1	78.4
Havana, Cuba.....	75.0	74.6	74.1	73.8	73.4	73.0	75.2	78.1	81.3	83.5	84.9	84.8	83.1	82.7	82.1	80.6	80.7	80.4	79.5	78.9	77.9	77.3	76.7	76.2	78.7
Kingston, Jamaica..	73.3	73.1	72.7	72.3	72.4	72.2	74.5	79.2	82.3	84.6	86.5	87.3	86.4	85.5	84.5	83.7	83.2	81.9	79.9	78.4	76.7	75.4	74.8	73.8	78.9
Port of Spain, Trin..	73.6	73.1	72.7	72.4	72.5	74.7	77.7	80.9	82.2	83.8	85.1	84.0	84.7	83.9	83.6	82.7	80.9	79.4	78.1	77.3	76.6	76.1	75.3	74.5	78.6
San Juan, P. R.....	75.8	75.8	75.3	74.8	74.8	75.6	77.7	80.6	81.4	81.5	82.3	82.4	83.2	82.8	82.0	81.5	80.4	79.1	78.1	78.3	77.4	77.2	76.9	76.5	78.8
Santiago de Cuba...	74.8	74.3	73.9	73.7	73.5	74.2	77.6	80.0	84.1	86.0	87.1	87.5	86.3	85.8	84.1	82.9	81.7	80.7	79.2	78.5	77.7	77.0	76.1	75.3	79.7
Santo Domingo, S. D.	72.6	72.0	71.7	71.6	71.3	72.0	75.3	78.6	81.1	83.0	84.1	83.3	82.5	81.3	81.0	80.2	79.6	77.7	76.3	75.6	74.7	73.9	73.5	73.0	76.9
Willemstad, Curaçao	78.1	78.1	77.9	77.8	77.6	78.3	80.1	81.5	82.2	83.1	83.6	84.3	84.2	84.4	83.3	82.8	81.4	80.3	79.6	79.2	79.0	78.9	78.6	78.5	80.5

TABLE IV.—*Mean pressure for each hour of seventy-fifth meridian time, June*, 1899.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midn't.	Mean.
Bismarck, N. Dak....	28.125	.130	.130	.132	.135	.142	.150	.157	.161	.160	.153	.148	.143	.136	.128	.120	.110	.104	.099	.101	.104	.116	.124	.127	.131
Boston, Mass.....	29.849	.849	.851	.856	.864	.880	.886	.887	.881	.875	.867	.859	.852	.842	.834	.832	.831	.841	.844	.853	.856	.861	.863	.862	.857
Buffalo, N. Y.....	29.205	.205	.207	.209	.222	.230	.239	.241	.241	.238	.237	.232	.221	.213	.205	.199	.194	.194	.196	.196	.209	.215	.217	.219	.216
Chicago, Ill.....	29.152	.150	.154	.156	.164	.177	.184	.192	.192	.194	.193	.190	.183	.174	.164	.154	.144	.138	.137	.138	.147	.156	.160	.164	.165
Cincinnati, Ohio	29.395	.391	.390	.395	.406	.420	.427	.432	.436	.436	.432	.426	.417	.404	.391	.379	.370	.365	.370	.376	.389	.401	.408	.406	.402
Cleveland, Ohio	29.234	.233	.232	.236	.246	.254	.261	.267	.266	.263	.263	.258	.250	.240	.233	.224	.216	.215	.219	.225	.232	.237	.242	.243	.241
Detroit, Mich.....	29.253	.255	.256	.256	.263	.273	.281	.290	.292	.289	.289	.285	.275	.265	.255	.246	.240	.235	.237	.244	.250	.262	.265	.269	.264
Dodge, Kans	27.365	.363	.365	.372	.373	.374	.382	.386	.398	.404	.398	.394	.385	.373	.359	.345	.330	.322	.318	.322	.329	.343	.362	.368	.364
Eastport, Me	29.864	.860	.860	.864	.869	.877	.885	.889	.887	.885	.879	.873	.863	.857	.852	.848	.846	.850	.858	.866	.877	.876	.876	.875	.868
Galveston, Tex.....	29.916	.911	.907	.905	.905	.910	.917	.924	.939	.947	.948	.948	.942	.934	.921	.909	.896	.885	.884	.890	.899	.910	.918	.921	.916
Havre, Mont.....	27.280	.280	.276	.276	.276	.280	.287	.290	.295	.293	.290	.286	.277	.269	.266	.260	.258	.257	.257	.254	.261	.274	.288	.297	.276
Independence, Cal..	25.900	.907	.912	.913	.915	.921	.927	.935	.946	.952	.957	.956	.954	.947	.930	.916	.900	.885	.871	.860	.861	.866	.881	.898	.913
Kansas City, Mo.....	28.989	.983	.980	.985	.988	.995	.005	.010	.020	.021	.020	.017	.013	.004	.994	.984	.975	.965	.964	.969	.974	.983	.994	.997	.993
Key West, Fla.....	30.023	.013	.005	.003	.009	.017	.030	.038	.044	.047	.045	.040	.030	.018	.006	.994	.987	.990	.998	.008	.016	.024	.028	.029	.018
Marquette, Mich ...	29.161	.160	.159	.159	.167	.172	.177	.182	.189	.188	.183	.183	.178	.173	.169	.166	.161	.157	.155	.151	.168	.172	.176	.175	.170
Memphis, Tenn.....	29.621	.618	.618	.620	.625	.636	.650	.659	.668	.671	.674	.670	.657	.645	.634	.624	.609	.602	.603	.608	.620	.629	.633	.632	.634
Mt. Tamalpais, Cal .	27.514	.512	.507	.503	.498	.494	.494	.502	.512	.522	.537	.543	.550	.556	.558	.555	.547	.536	.525	.515	.507	.504	.507	.516	.521
New Orleans, La.....	29.984	.978	.973	.971	.976	.985	.992	.997	.008	.009	.010	.008	.000	.987	.977	.967	.956	.953	.956	.961	.972	.983	.989	.989	.982
New York, N. Y.....	29.686	.685	.683	.684	.695	.704	.713	.716	.714	.712	.708	.702	.692	.683	.672	.667	.666	.669	.677	.685	.697	.702	.705	.708	.692
Philadelphia, Pa.....	29.914	.910	.910	.913	.924	.930	.941	.946	.943	.941	.941	.933	.920	.908	.897	.888	.884	.885	.895	.901	.918	.925	.927	.924	.918
Pittsburg, Pa.....	29.165	.164	.166	.169	.176	.186	.192	.193	.195	.192	.186	.180	.174	.162	.154	.147	.141	.141	.151	.156	.172	.176	.176	.175	.170
Portland, Oreg.....	29.931	.934	.938	.943	.945	.948	.951	.955	.964	.969	.972	.974	.972	.969	.964	.957	.947	.941	.932	.924	.921	.922	.927	.939	.947
St. Louis, Mo.....	29.413	.410	.413	.417	.423	.434	.445	.455	.463	.461	.460	.454	.442	.431	.417	.406	.399	.391	.393	.397	.408	.414	.423	.424	.435
St. Paul, Minn.....	29.046	.046	.045	.048	.050	.063	.071	.070	.073	.076	.076	.076	.071	.066	.061	.051	.042	.034	.029	.029	.029	.040	.047	.047	.054
Salt Lake City, Utah.	25.583	.587	.587	.590	.595	.601	.608	.619	.629	.637	.640	.639	.637	.627	.617	.610	.599	.586	.575	.572	.572	.575	.585	.592	.603
San Diego, Cal.....	29.829	.827	.820	.814	.806	.802	.802	.807	.816	.825	.830	.833	.836	.835	.831	.826	.820	.811	.808	.801	.804	.807	.815	.823	.818
San Francisco, Cal...	29.795	.794	.791	.787	.785	.786	.789	.795	.804	.814	.823	.825	.824	.821	.813	.805	.797	.786	.776	.768	.771	.777	.785	.798	.796
Santa Fe, N. Mex ...	23.317	.318	.317	.318	.319	.322	.330	.335	.346	.351	.351	.348	.342	.334	.321	.310	.300	.293	.281	.280	.291	.296	.311	.322	.319
Savannah, Ga.....	29.982	.979	.975	.976	.983	.990	.002	.011	.019	.018	.013	.008	.987	.972	.954	.945	.940	.943	.953	.963	.977	.986	.991	.990	.981
Washington, D. C....	29.926	.925	.925	.925	.933	.945	.952	.958	.959	.957	.956	.949	.941	.930	.917	.907	.899	.899	.903	.909	.918	.927	.932	.937	.930
West Indies.																									
Basseterre, St. Kitts.	29.970	.961	.959	.962	.971	.985	.994	.001	.006	.004	.997	.986	.974	.961	.953	.951	.958	.967	.980	.993	.001	.004	.999	.984	.980
Bridgetown, Bar....	29.918	.914	.916	.920	.932	.940	.948	.953	.956	.950	.940	.927	.911	.901	.897	.897	.906	.919	.935	.947	.956	.956	.945	.929	.930
Cienfuegos, Cuba....	29.941	.932	.928	.928	.934	.948	.960	.966	.967	.968	.961	.951	.936	.923	.911	.908	.909	.919	.935	.951	.962	.964	.961	.952	.942
Havana, Cuba.....	29.951	.941	.932	.931	.938	.949	.963	.971	.974	.975	.973	.966	.953	.945	.934	.929	.926	.926	.938	.947	.955	.965	.969	.964	.951
Kingston, Jamaica..	29.679	.664	.655	.648	.648	.662	.678	.682	.685	.684	.680	.665	.647	.632	.622	.617	.618	.615	.640	.665	.680	.692	.695	.689	.660
Port of Spain, Trin..	29.886	.881	.879	.884	.892	.907	.917	.921	.921	.915	.899	.884	.863	.848	.839	.838	.847	.860	.881	.899	.909	.915	.910	.899	.887
San Juan, P. R.....	29.924	.915	.914	.918	.925	.935	.944	.951	.953	.951	.946	.938	.927	.918	.905	.902	.910	.920	.932	.944	.953	.957	.950	.938	.932
Santiago de Cuba...	29.878	.873	.868	.871	.877	.887	.898	.903	.905	.905	.897	.884	.875	.862	.854	.851	.852	.860	.872	.890	.900	.907	.905	.895	.882
Santo Domingo, S. D.	29.961	.953	.950	.950	.959	.971	.983	.988	.992	.985	.972	.962	.950	.938	.929	.926	.932	.943	.956	.970	.983	.993	.987	.975	.963
Willemstad, Curaçao	29.843	.833	.827	.829	.835	.851	.860	.867	.871	.867	.853	.837	.813	.794	.776	.771	.777	.792	.816	.841	.860	.868	.865	.855	.833

TABLE V.—*Average wind movement for each hour of seventy-fifth meridian time, June, 1899.*

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Abilene, Tex.	8.7	9.9	9.6	9.6	9.6	9.9	9.2	9.3	10.6	12.0	12.9	13.0	14.1	14.5	13.9	13.9	13.8	12.9	12.4	12.5	10.2	8.4	8.4	8.0	11.1
Albany, N. Y.	5.4	4.8	5.2	5.5	5.5	6.0	6.6	7.3	7.5	8.4	8.7	9.4	9.7	10.2	10.1	10.1	10.0	8.8	7.4	6.3	6.1	6.6	6.6	6.0	7.4
Alpena, Mich.	6.2	6.3	6.4	6.4	6.7	7.4	8.5	11.1	11.8	11.6	11.4	11.6	12.0	11.9	12.6	12.0	11.5	10.5	9.4	7.2	6.5	6.3	6.8	6.0	9.1
Amarillo, Tex.	17.6	16.8	16.2	15.2	15.1	14.8	14.6	14.5	15.1	15.8	14.7	14.7	14.8	15.0	15.7	17.6	18.2	19.4	20.4	19.3	17.4	18.2	16.7	17.6	16.5
Atlanta, Ga.	6.2	6.3	6.1	6.6	6.7	6.6	6.2	6.8	7.2	7.2	7.4	8.0	8.4	8.5	9.3	9.6	8.8	9.1	7.4	6.1	5.9	6.0	6.2	6.2	7.2
Atlantic City, N. J.	7.3	7.3	7.3	7.2	7.0	7.3	8.5	9.2	9.7	9.8	9.9	10.0	10.7	11.0	11.5	11.1	10.7	10.1	9.3	8.6	8.2	8.2	8.0	6.9	8.9
Augusta, Ga.	4.2	4.0	3.7	3.6	3.5	3.8	3.7	4.5	5.7	5.6	6.3	6.9	7.9	8.2	8.5	8.9	9.0	8.1	7.0	5.7	5.1	5.3	4.6	4.4	5.8
Baker City, Oreg.	3.6	3.6	4.1	4.7	5.0	5.8	6.2	6.4	5.5	5.3	3.9	3.9	4.7	5.6	6.7	7.6	8.0	7.9	8.4	8.7	7.9	6.7	5.5	4.1	5.8
Baltimore, Md.	3.3	3.6	3.2	3.1	2.9	3.5	4.1	5.3	5.6	6.0	6.6	6.8	7.0	7.0	7.0	6.8	6.4	6.2	5.5	4.0	3.0	3.0	3.0	3.4	4.8
Bismarck, N. Dak.	6.9	7.5	7.4	8.0	7.6	6.8	7.0	8.2	9.7	10.6	11.5	11.9	12.9	13.3	13.6	13.0	12.8	13.1	12.1	10.3	8.9	7.8	7.1	7.5	9.8
Block Island, R. I.	11.4	10.9	9.9	9.6	9.5	9.0	9.7	10.6	11.1	12.0	12.6	12.3	13.3	14.4	14.0	14.0	14.2	13.6	12.2	12.3	12.0	12.0	11.5	11.3	11.8
Boise, Idaho	4.4	4.2	3.8	4.0	3.3	3.4	2.9	2.6	2.3	3.3	4.6	5.3	6.6	7.0	7.4	7.3	7.5	7.4	8.0	7.7	7.0	5.6	5.0	4.5	5.2
Boston, Mass.	9.9	9.6	9.4	8.9	8.5	8.6	8.9	9.7	9.9	10.3	11.1	11.6	11.9	13.0	12.7	12.6	12.4	11.9	10.5	9.9	9.5	10.5	10.0	10.2	10.5
Buffalo, N. Y.	12.5	12.5	11.4	11.2	10.4	10.6	9.8	10.5	11.3	11.3	12.0	12.2	13.7	13.9	14.0	14.0	13.6	12.6	11.6	11.1	10.5	11.3	11.7	11.5	11.9
Cairo, Ill.	5.4	5.3	5.5	5.5	5.6	5.6	5.8	6.8	7.5	7.8	9.0	9.3	9.0	9.3	9.7	9.8	9.4	9.2	7.8	7.0	5.6	5.3	5.3	4.8	7.1
Cape Henry, Va.	11.1	10.4	9.9	10.2	10.6	11.4	11.9	12.7	12.9	12.7	11.1	11.5	11.3	13.0	13.1	13.3	13.6	12.9	11.9	11.4	11.9	11.3	10.2	11.0	11.7
Carson City, Nev.	6.8	6.2	4.9	4.4	3.9	3.9	4.1	3.5	2.7	2.8	4.0	5.3	5.1	6.4	7.6	9.8	10.1	11.2	11.6	12.5	12.2	11.7	10.4	7.6	7.0
Charleston, S. C.	8.6	8.9	8.3	8.7	8.3	8.3	8.9	10.9	11.4	11.1	10.8	11.9	13.0	14.0	15.2	15.1	14.2	13.6	12.8	11.5	11.5	10.5	9.6	9.3	11.1
Charlotte, N. C.	5.4	5.2	4.6	4.5	4.2	4.9	4.6	5.8	6.0	6.6	6.3	7.1	7.4	8.4	8.4	8.3	8.6	8.3	8.2	7.0	5.5	5.4	5.0	5.2	5.5
Chattanooga, Tenn.	4.6	3.9	3.8	3.6	3.7	4.0	4.1	4.6	5.4	6.3	7.1	7.4	8.4	8.4	8.3	8.6	8.3	8.2	7.0	5.5	4.6	4.1	3.7	3.8	6.0
Cheyenne, Wyo.	7.3	7.3	8.8	8.4	8.0	7.5	7.3	8.0	9.5	10.7	11.3	11.1	12.1	12.4	12.2	11.4	11.0	11.9	12.1	12.0	12.0	8.6	8.5	8.2	5.7
Chicago, Ill.	14.8	15.6	15.2	15.6	16.1	16.6	15.6	15.9	15.5	15.2	15.7	15.8	16.5	16.7	17.5	18.4	19.1	18.4	16.5	16.1	15.0	15.3	15.4	14.3	9.9
Cincinnati, Ohio.	4.2	4.0	4.3	4.3	4.6	4.7	5.1	6.1	7.2	8.2	8.5	9.4	9.5	9.6	9.8	10.0	9.7	9.1	8.3	7.1	6.0	5.4	5.2	4.4	16.1
Cleveland, Ohio.	13.1	12.7	12.5	12.2	12.6	12.7	12.3	11.3	12.5	13.4	13.5	13.8	13.6	13.6	13.2	13.0	12.0	12.0	11.1	10.3	10.3	11.5	11.5	12.4	6.9
Columbia, Mo.	6.1	5.9	5.7	6.3	6.9	6.5	6.4	7.1	7.9	8.5	8.8	8.9	9.2	9.2	9.6	10.1	9.5	8.2	6.8	5.7	5.2	5.3	5.8	6.0	12.4
Columbus, Ohio.	5.7	5.3	5.1	4.8	5.4	5.2	5.3	6.2	7.2	7.8	8.6	9.2	9.6	9.7	10.4	10.6	9.9	9.5	9.8	8.9	7.4	7.1	6.2	6.1	7.3
Concordia, Kans.	9.2	8.0	7.2	6.8	6.6	6.3	6.3	6.3	8.1	9.3	9.9	9.8	9.8	9.6	10.0	10.5	10.7	10.1	9.8	9.2	7.9	8.0	7.9	8.6	7.5
Corpus Christi, Tex.	15.2	14.6	13.5	13.0	12.9	11.7	11.8	12.1	13.6	14.6	14.4	14.3	14.9	15.9	16.7	17.3	17.3	17.5	17.4	17.2	16.7	16.4	15.7	15.2	8.6
Davenport, Iowa.	6.5	6.0	6.3	6.1	6.5	5.8	6.5	7.2	8.1	8.8	9.3	9.7	9.9	10.1	10.7	10.8	9.9	9.4	9.1	7.6	5.9	5.4	5.6	5.7	15.0
Denver, Colo.	7.8	8.5	7.9	6.8	7.2	7.7	6.6	5.9	5.8	6.8	6.5	6.6	7.0	7.5	8.2	9.3	8.3	9.7	10.2	11.9	12.2	10.0	9.4	8.1	7.7
Des Moines, Iowa.	7.7	7.4	7.0	6.4	6.3	6.4	6.4	7.3	8.5	10.4	11.7	12.1	12.0	12.3	13.1	12.8	12.9	13.4	10.9	10.1	7.7	6.5	6.9	8.1	8.2
Detroit, Mich.	7.2	7.5	7.4	7.4	7.8	7.4	7.7	8.7	9.5	9.9	10.6	11.1	11.8	12.0	12.1	12.5	12.1	10.9	9.6	9.2	8.1	8.0	7.7	8.2	9.3
Dodge, Kans.	13.0	12.3	12.6	11.9	11.1	10.8	10.7	11.6	13.5	14.3	14.1	14.2	15.0	16.0	16.3	17.0	17.2	17.6	18.1	16.7	15.1	13.8	14.1	13.5	9.4
Dubuque, Iowa.	5.6	6.0	5.8	5.6	5.2	5.2	5.9	6.9	7.5	9.0	9.7	10.3	10.7	10.7	10.6	10.5	10.4	9.4	8.7	7.4	6.3	5.9	5.8	6.1	14.2
Duluth, Minn.	6.8	6.9	6.9	7.7	8.8	8.6	9.4	10.3	10.4	11.0	11.7	12.1	12.3	12.9	13.2	13.3	12.2	11.6	11.1	9.5	7.8	8.5	7.3	6.7	7.7
Eastport, Me.	7.5	7.2	7.3	7.2	7.7	7.6	8.1	8.0	7.8	8.8	10.1	10.4	11.4	11.7	11.7	10.4	10.4	9.0	8.7	8.2	8.0	7.7	7.5	6.8	9.9
Elkins, W. Va.	1.9	1.7	1.5	1.6	1.5	2.0	2.1	2.4	3.1	3.9	4.7	5.4	6.1	6.5	6.4	5.9	5.8	5.2	3.9	2.6	2.4	2.1	1.8	2.1	8.7
El Paso, Tex.	11.3	11.6	10.4	10.2	10.2	9.2	8.6	8.6	8.2	9.3	9.6	10.1	11.1	11.0	11.1	11.6	12.7	13.4	14.0	15.5	13.8	11.8	9.8	9.4	3.4
Erie, Pa.	9.6	9.5	9.4	9.4	9.7	9.1	8.2	9.0	9.8	10.5	10.8	10.9	9.9	10.2	9.7	8.8	8.1	8.0	7.0	6.7	7.6	8.3	9.4	9.4	10.9
Escanaba, Mich.	7.6	7.3	6.2	6.6	6.8	6.4	7.0	7.9	9.1	9.4	10.3	10.2	10.8	11.7	11.5	11.3	10.4	10.3	10.0	9.5	9.1	9.4	8.6	8.1	9.1
Eureka, Cal.	7.9	5.8	4.7	5.0	4.6	4.7	4.2	4.4	3.7	3.5	4.6	6.2	8.8	10.8	12.3	13.7	14.2	14.7	14.2	13.0	12.8	12.2	10.3	8.8	9.0
Evansville, Ind.	5.0	4.6	5.0	5.3	4.8	4.9	5.0	6.0	6.7	7.1	7.7	8.3	8.0	8.4	8.6	8.8	9.3	9.5	8.2	6.2	5.4	4.9	4.8	4.8	8.6
Fort Canby, Wash.	9.8	9.6	9.5	9.2	9.6	9.2	8.8	9.0	8.3	9.0	8.7	9.0	9.5	10.5	12.0	11.4	10.6	11.1	11.2	11.5	11.2	11.2	10.7	10.9	6.5
Fort Smith, Ark.	4.2	4.8	5.0	4.7	4.9	4.6	4.9	5.0	6.0	6.7	7.5	7.9	8.0	7.5	8.5	8.5	7.8	7.6	6.1	5.3	4.5	4.5	4.4	3.9	10.1
Fresno, Cal.	9.5	9.5	9.2	8.2	7.1	6.1	5.6	5.5	4.7	4.9	5.3	5.3	5.6	5.1	5.3	5.7	5.9	6.4	7.4	8.1	8.8	8.9	8.6	8.8	5.9
Galveston, Tex.	11.1	11.6	11.8	11.7	11.8	11.3	10.5	11.0	11.4	12.1	11.9	11.7	11.4	11.7	12.0	12.3	12.2	11.9	11.1	11.2	11.5	11.5	11.4	11.2	6.9
Grand Haven, Mich.	8.3	8.5	8.6	8.7	8.7	8.4	9.0	10.3	10.0	10.6	11.2	11.6	11.2	11.8	11.8	11.3	11.3	10.0	9.3	8.5	7.6	7.0	7.3	7.6	11.6
Grand Junction, Colo.	4.4	4.8	4.9	4.6	5.7	5.8	5.7	5.5	5.8	6.8	7.1	7.2	5.9	6.5	7.1	7.0	8.4	8.8	8.3	7.7	6.2	4.4	4.3	4.2	9.5
Green Bay, Wis.	6.6	5.4	5.7	5.5	5.5	5.2	5.6	7.2	7.7	8.0	9.1	9.4	10.3	10.2	10.7	11.3	10.6	9.6	9.5	8.1	6.9	6.9	6.7	6.6	6.1
Hannibal, Mo.	8.2	8.2	8.5	7.5	7.8	7.6	7.9	9.5	10.4	11.4	11.6	11.9	12.0	11.8	12.2	12.6	11.6	10.9	8.3	6.9	6.3	6.8	7.3	7.6	7.8
Harrisburg, Pa.	4.3	4.1	4.2	4.2	4.1	4.1	4.6	5.7	6.1	6.6	7.3	7.0	7.6	7.7	8.1	7.7	7.0	6.5	6.0	4.8	4.0	4.3	3.9	3.9	9.4
Hatteras, N. C.	10.7	10.9	10.5	10.7	10.9	10.8	11.9	12.6	12.9	12.8	12.8	13.3	13.3	14.2	14.4	14.0	14.4	13.9	13.6	12.8	12.5	11.6	11.2	10.4	5.6
Havre, Mont.	7.8	7.7	7.6	7.5	8.4	8.9	9.1	9.5	11.6	12.8	12.8	13.3	14.1	14.7	15.5	15.5	16.0	16.1	15.4	14.0	12.2	10.5	10.2	7.4	12.4
Helena, Mont.	9.7	9.7	9.2	7.7	7.7	7.7	6.9	5.6	5.1	7.6	9.0	9.2	9.6	10.7	11.8	12.9	12.7	12.2	11.8	11.3	11.1	8.9	9.3	9.3	11.6
Huron, S. Dak.	9.7	10.3	10.0	9.1	9.0	8.5	7.9	8.4	8.8	10.0	10.6	12.0	13.6	15.4	15.2	15.7	15.8	15.6	14.1	12.9	11.3	10.8	10.9	10.1	9.4
Independence, Cal.	7.0	8.1	7.8	7.3	7.8	8.4	7.9	7.6	8.5	8.2	8.7	9.0	8.8	8.0	8.6	9.9	11.3	11.3	12.1	13.0	12.7	11.4	10.1	8.6	11.5
Indianapolis, Ind.	8.9	8.4	8.2	8.3	8.0	7.9	7.5	8.6	10.3	10.5	11.3	11.4	12.3	12.1	12.5	12.8	12.5	12.3	10.9	9.4	8.4	8.6	8.3	8.4	9.3
Jacksonville, Fla.	5.8	6.1	6.3	5.7	5.3	5.1	5.0	5.8	6.2	6.5	6.5	6.6	6.7	8.4	8.6	9.6	9.4	9.6	8.6	8.0	6.4	5.8	6.0	5.7	9.9
Jupiter, Fla.	8.1	8.5	8.3	8.3	8.1	7.5	7.3	8.5	9.3	10.7	11.4	11.7	12.4	13.3	13.3	12.8	12.0	10.3	9.7	8.3	7.9	7.8	7.6	7.9	6.8
Kalispell, Mont.	4.9	4.4	4.6	4.7	4.2	4.4	4.4	4.2	4.4	4.3	5.0	6.2	8.3	8.9	10.1	10.8	10.3	10.0	10.0	8.8	8.6	7.0	5.3	5.1	9.6
Kansas City, Mo.	8.6	9.1	8.0	8.0	8.1	8.0	7.7	8.3	9.1	10.0	10.4	10.8	11.3	11.7	12.3	12.4	11.9	11.1	10.5	9.9	8.6	8.1	8.1	8.5	6.6
Keokuk, Iowa.	6.6	6.7	7.1	6.7	6.7	7.0	6.5	7.4	8.3	9.4	9.3	9.8	10.0	10.1	9.3	9.5	9.4	9.6	8.2	6.5	5.6	6.3	6.6	6.5	9.6
Key West, Fla.	8.1	7.7	7.4	7.6	7.3	7.0	7.3	8.1	8.6	9.2	9.4	10.1	10.8	10.2	9.7	10.0	9.4	9.0	8.9	8.4	8.2	8.1	8.2	7.5	7.9
Kittyhawk, N. C.	11.3	12.0	12.6	12.1	12.5	12.5	13.0	13.8	14.8	14.8	14.3	13.8	13.3	14.1	14.8	15.8	14.6	15.4	13.8	13.6	13.5	13.5	12.1	11.9	8.6
Knoxville, Tenn.	4.7	4.2	4.6	4.4	4.3	3.9	3.7	4.0	4.8	5.7	6.6	7.1	7.7	8.1	7.8	8.2	7.8	7.6	7.3	6.1	6.3	4.9	5.1	4.6	13.5
La Crosse, Wis.	5.7	6.3	6.3	6.0	5.7	5.9	6.4	6.5	7.2	7.8	8.7	8.8	8.7	8.9	8.9	8.6	8.3	7.2	7.0	7.0	6.1	5.2	5.6	5.2	5.8
Lander, Wyo.	5.7	4.6	4.6	3.8	3.9	3.9	3.1	2.9	2.5	2.9	4.3	5.5	5.9	7.7	8.6	9.3	8.8	8.5	8.1	8.1	7.7	5.7	6.0	5.6	7.0
Lexington, Ky.	8.0	7.8	7.6	7.4	7.0	6.8	6.8	7.4	9.1	9.5	10.0	9.5	10.0	10.1	10.2	10.3	10.0	9.0	8.2	7.3	6.8	7.4	7.6	7.7	5.7
Little Rock, Ark.	4.9	4.6	4.7	4.7	5.2	5.0	5.1	5.9	7.2	8.0	8.5	8.5	8.7	8.7	9.0	9.4	10.1	8.5	8.4	7.4	6.0	5.9	5.4	4.9	8.4
Los Angeles, Cal.	2.8	2.2	2.1	2.3	2.2	2.2	1.9	2.0	2.0	2.5	2.8	3.3	4.1	5.0	6.4	7.7	8.4	8.9	8.5	8.4	7.3	6.2	4.8	3.4	6.9
Louisville, Ky.	4.9	5.3	5.4	5.7	5.9	5.5	5.5	6.5	7.4	8.0	8.9	9.4	9.7	10.1	10.1	10.0	10.0	9.4	8.4	7.0	5.7	5.4	5.1	5.0	4.5
Lynchburg, Va.	1.2	1.3	1.8	1.3	0.9	1.4	1.7	2.8	3.8	4.5	4.4	4.9	5.1	5.1	4.7	4.9	4.9	5.2	3.7	2.3	1.9	1.3	1.5	1.2	7.3
Macon, Ga.	3.7	3.7	3.5	3.7	3.3	3.0	3.5	5.2	6.1	6.6	6.8	7.5	7.7	7.9	8.8	8.9	8.4	7.8	6.7	5.5	4.6	4.3	3.7	4.0	3.0
Marquette, Mich.	7.6	7.8	8.4	8.3	8.8	8.5	8.1	9.4	11.1	11.7	11.6	12.4	11.9	11.6	11.9	11.7	11.2	10.0	8.3	7.1	6.5	6.6	6.9	8.1	5.6
Memphis, Tenn.	5.8	6.0	5.5	5.7	5.3	5.4	5.3	6.0	6.5	7.0	6.9	7.1	7.3	7.8	8.6	8.4	8.1	7.3	6.8	6.2	6.3	6.1	5.7	5.6	9.4
Milwaukee, Wis.	8.2	7.9	8.5	8.4	8.7	8.9	8.8	8.5	9.3	10.2	10.5	10.7	12.2	12.7	12.7	13.2	12.9	11.7	10.7	9.3	8.5	7.5	8.0	8.3	6.5
Minneapolis, Minn.	10.4	9.8	9.5	9.0	8.6	8.9	9.0	9.6	9.6	10.0	10.8	11.6	11.1	12.1	11.0	11.9	11.3	11.2	11.5	9.7	8.4	8.4	8.9	10.1	9.8
Mobile, Ala.	4.7	4.8	4.1	4.5	4.2	4.2	3.5	4.8	5.8	6.8	6.5	7.7	9.7	10.4	10.6	10.2	10.4	9.4	8.6	7.5	6.6	6.5	5.8	5.0	10.1
Montgomery, Ala.	4.4	4.5	4.5	4.0	3.7	3.8	3.8	4.8	6.0	5.8	6.0	6.6	7.1	7.6	7.6	8.0	8.2	7.2	7.5	6.0	4.8	4.4	4.2	4.6	6.8
Moorhead, Minn.	8.8	8.9	8.7	9.0	9.0	9.1	8.9	9.9	10.4	11.2	10.9	11.5	12.3	12.6	12.5	13.1	13.5	12.5	11.9	11.8	9.9	9.2	8.4	9.3	5.6
Mount Tamalpais, Cal.	27.0	25.8	25.3	24.4	24.0	24.2	24.7	24.2	22.2	20.9	18.1	16.2	14.5	12.3	10.9	10.2	9.8	11.6	14.5	16.8	21.1	24.2	25.1	27.1	10.6
Nantucket, Mass.	8.3	9.0	9.4	9.3	9.2	9.5	9.8	10.9	11.1	11.6	12.3	12.2	11.7	12.3	12.2	11.7	10.4	9.1	8.1	8.1	7.6	8.2	8.5	8.5	19.8
Nashville, Tenn.	3.5	3.6	3.2	3.1	2.9	2.9	3.2	4.4	6.2	7.7	8.3	8.3	8.3	8.2	8.3	9.1	9.1	8.3	7.7	6.9	5.5	4.7	4.4	4.0	10.0
Neah, Wash.	7.7	7.4	6.9	6.7	7.0	6.5	6.5	5.9	5.6	6.1	6.2	6.9	7.4	8.3	9.2	10.3	11.4	12.0	11.5	12.2	11.8	10.5	9.9	8.6	5.9
New Haven, Conn.	5.6	5.9	5.9	5.3	4.8	4.4	5.1	7.7	7.8	7.9	8.6	9.3	9.7	10.6	11.1	10.9	10.8	9.5	7.8	6.3	6.1	6.2	5.7	5.4	8.4
																									7.4

TABLE V.—*Average wind movement, etc.*—Continued.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
New Orleans, La.	5.8	5.7	5.6	5.3	5.0	5.1	4.6	5.3	7.0	8.0	8.5	8.8	10.0	11.0	9.7	9.4	9.9	9.7	9.1	7.9	7.2	6.9	6.5	5.9	7.4
New York, N. Y.	9.3	10.4	10.5	11.0	10.1	9.1	9.5	9.7	10.1	10.4	11.5	12.0	12.1	13.3	13.4	13.6	13.9	14.1	12.5	12.1	11.7	11.2	11.3	10.4	11.4
Norfolk, Va.	7.0	6.3	5.9	5.7	6.3	6.7	7.7	9.1	10.0	9.6	9.2	8.8	9.0	9.6	9.5	9.8	10.2	10.0	9.2	9.0	8.8	8.2	7.0	6.8	8.3
Northfield, Vt.	6.8	6.4	5.4	5.8	6.1	6.3	6.5	7.9	9.2	10.5	12.1	12.1	12.8	12.9	12.9	12.4	12.1	11.3	9.3	8.0	7.6	7.4	7.9	7.0	9.0
North Platte, Nebr.	9.6	9.3	8.3	6.9	7.2	7.5	7.4	6.8	7.7	9.0	10.1	10.5	10.9	12.0	13.0	13.2	13.2	13.6	13.2	12.7	11.1	10.0	9.9	9.5	10.1
Oklahoma, Okla.	8.6	9.2	9.9	9.8	9.3	9.4	8.7	9.6	11.2	12.3	13.1	13.6	13.3	14.4	13.7	13.7	14.0	13.1	11.6	11.1	8.9	8.5	8.1	8.3	11.0
Omaha, Nebr.	7.6	7.7	7.8	7.6	8.4	7.4	6.2	6.3	8.3	9.4	9.1	9.7	10.6	10.4	10.7	10.6	10.0	9.3	9.0	9.3	8.5	7.6	8.0	8.3	8.7
Oswego, N. Y.	7.2	7.2	7.9	7.5	7.3	7.4	7.8	8.5	9.0	9.4	9.0	9.2	9.9	9.5	9.3	8.7	8.5	8.5	8.7	7.6	6.9	7.5	7.4	7.6	8.1
Palestine, Tex.	7.0	7.1	6.2	6.2	5.6	5.2	5.3	5.6	7.0	8.2	8.8	8.8	8.9	9.0	8.9	9.4	8.6	8.5	7.6	7.4	6.4	6.5	7.0	7.0	7.4
Parkersburg, W. Va.	3.1	3.0	2.7	2.7	3.1	3.1	3.6	3.7	4.9	4.9	5.3	5.2	6.1	6.3	6.5	6.6	6.4	5.9	5.2	4.2	3.3	4.1	3.6	2.7	4.4
Pensacola, Fla.	7.1	7.5	7.3	7.7	7.4	7.0	7.3	7.6	8.2	8.4	8.9	8.7	9.6	10.5	10.1	11.2	10.3	10.3	9.7	9.5	7.9	7.4	8.1	7.4	8.6
Phenix, Ariz.	4.2	4.1	4.1	4.4	4.2	3.9	4.1	3.9	4.9	5.4	6.3	6.1	5.9	5.6	5.2	6.1	6.4	6.5	6.7	6.6	5.4	4.0	3.9	4.2	5.1
Philadelphia, Pa.	8.2	7.6	7.5	7.4	7.0	7.6	8.9	9.2	9.2	9.7	10.3	10.2	11.1	11.7	11.6	11.4	11.2	10.5	9.4	8.7	9.0	8.8	8.0	7.4	9.2
Pierre, S. Dak.	9.0	7.1	6.8	6.7	6.8	7.0	7.2	7.4	9.6	11.7	13.1	14.0	14.5	14.7	15.0	14.5	15.5	14.9	15.6	13.9	11.2	10.5	9.4	9.8	11.1
Pittsburg, Pa.	4.0	3.6	3.6	3.4	3.5	3.8	4.0	4.3	4.8	5.2	5.9	6.1	6.4	6.1	5.8	5.7	6.2	6.2	5.4	4.9	4.7	4.3	4.3	4.3	4.8
Point Reyes Lt., Cal.	23.8	23.9	23.4	24.4	23.2	22.6	22.0	21.2	21.0	21.1	20.9	20.9	21.2	20.1	18.7	19.2	19.4	20.2	20.8	21.1	22.0	22.9	23.3	24.0	21.7
Port Crescent, Wash.	5.6	5.2	4.8	4.2	3.6	3.2	3.1	3.1	3.1	3.3	4.7	5.6	7.0	7.6	7.6	7.5	7.9	8.2	8.4	8.7	8.3	8.2	7.6	6.5	6.0
Port Huron, Mich.	8.9	9.1	8.6	8.5	8.7	8.1	8.4	9.5	10.4	11.5	11.7	11.4	12.1	11.9	12.0	12.4	12.0	12.2	10.4	9.3	9.0	8.6	9.1	9.2	10.1
Portland, Me.	5.7	5.9	6.0	5.5	5.5	5.0	5.5	6.3	7.2	7.9	8.3	9.5	10.4	11.4	10.9	9.8	9.0	8.3	6.8	6.5	7.2	6.6	6.1	6.0	7.4
Portland, Oreg.	9.1	8.1	7.9	6.2	5.9	5.6	5.4	5.1	5.4	6.1	6.8	7.2	7.5	7.9	8.4	8.6	9.0	9.3	9.3	10.1	10.6	10.3	10.0	9.6	7.8
Pueblo, Colo.	5.6	5.7	5.7	5.2	5.4	4.8	4.6	3.9	4.5	5.4	5.9	6.5	8.4	8.8	9.2	10.1	9.8	10.2	12.1	12.4	11.5	9.4	7.9	6.5	7.5
Raleigh, N. C.	4.3	4.1	4.0	3.9	3.8	4.2	4.8	5.9	6.1	6.2	6.1	6.0	6.5	6.6	6.5	6.7	6.5	6.5	5.2	4.6	4.5	4.7	4.3	4.5	5.3
Rapid City, S. Dak.	4.4	3.7	3.7	3.5	4.1	4.2	3.9	4.2	4.6	4.8	5.6	6.0	6.0	5.6	5.5	6.4	5.9	5.5	5.2	5.7	4.9	3.9	3.7	4.3	4.8
Red Bluff, Cal.	7.6	8.1	7.6	7.3	6.2	6.5	6.4	6.9	6.6	7.6	9.7	9.8	10.4	10.2	9.6	8.9	8.6	8.4	7.9	7.8	8.0	7.1	6.5	6.9	7.9
Richmond, Va.	4.7	4.4	4.6	5.0	4.9	5.5	5.6	6.3	7.1	6.8	7.0	7.5	8.1	8.5	8.4	8.4	8.2	7.7	6.5	5.1	4.5	4.7	4.9	4.5	6.2
Rochester, N. Y.	5.9	6.5	6.7	6.5	6.4	6.3	6.7	7.4	7.9	7.8	8.7	9.1	9.3	9.2	9.6	9.9	9.1	8.2	6.7	5.6	5.3	5.3	5.8	5.9	7.3
Roseburg, Oreg.	2.9	2.3	2.0	2.2	1.9	2.3	1.7	1.6	1.5	2.0	2.6	3.5	4.2	5.1	5.8	6.8	6.8	8.3	8.5	8.8	8.8	8.1	5.6	4.4	4.5
Sacramento, Cal.	8.7	8.4	9.2	9.4	9.3	8.1	8.5	7.4	7.4	7.3	7.3	7.9	8.6	9.0	8.9	9.6	9.5	9.2	9.4	9.6	9.8	9.6	10.1	9.1	8.8
St. Louis, Mo.	5.9	6.1	6.6	7.5	7.4	7.0	7.5	8.9	10.0	10.5	10.9	10.8	11.1	11.3	11.2	11.4	11.4	9.8	9.8	8.8	7.4	6.9	6.9	6.9	8.9
St. Paul, Minn.	6.4	6.6	6.4	6.4	6.2	5.8	5.7	6.8	7.5	7.6	8.7	9.3	9.4	10.6	10.1	9.7	9.2	9.1	9.4	8.8	7.4	6.9	5.1	6.1	7.6
Salt Lake City, Utah.	5.7	5.1	4.6	4.3	4.2	3.9	4.4	3.9	3.2	3.3	4.3	6.1	7.8	8.7	9.3	10.9	11.0	9.7	10.2	9.0	7.7	6.4	6.3	5.6	6.5
San Antonio, Tex.	9.3	8.1	7.6	7.5	8.0	7.7	7.9	7.8	8.8	10.5	11.0	10.9	10.9	10.9	10.9	11.2	11.8	11.9	11.9	11.1	10.3	10.2	10.2	9.9	9.8
San Diego, Cal.	4.2	4.1	3.6	3.4	3.7	3.6	4.0	3.9	3.6	4.3	4.7	6.6	8.6	9.9	10.8	11.2	11.9	9.7	9.8	8.8	7.7	6.8	5.5	4.8	6.5
Sandusky, Ohio	6.7	7.3	7.3	7.3	7.0	7.1	7.2	7.8	8.5	8.4	8.8	8.4	9.0	9.2	9.0	8.7	8.8	8.1	6.9	6.1	6.5	6.5	6.9	7.1	7.7
Sandy Hook, N. J.	11.5	11.7	10.6	11.8	11.3	11.4	10.5	9.9	9.8	9.9	10.5	11.5	12.6	12.6	13.5	12.6	11.4	11.8	11.7	12.1	12.6	13.0	12.0	11.5	
San Francisco, Cal.	13.4	12.0	10.6	9.6	9.5	8.5	7.1	7.4	7.1	7.0	7.4	8.0	9.2	12.4	16.0	20.0	23.0	24.2	25.1	25.5	23.8	20.9	17.2	14.8	14.2
San Luis Obispo, Cal.	3.1	2.7	2.6	2.5	2.5	2.5	2.6	2.9	2.8	2.7	3.2	3.9	5.3	6.3	7.3	7.9	8.3	8.7	8.2	9.9	6.8	5.4	4.6	3.5	4.8
Santa Fe, N. Mex.	6.8	6.7	6.6	5.7	4.5	4.8	3.7	3.1	3.8	4.8	5.9	6.9	8.3	9.6	10.4	11.4	11.4	11.2	10.8	9.9	8.8	6.6	6.6	7.6	8.3
Sault Ste. Marie, Mich.	4.7	5.6	5.5	6.2	5.9	5.8	6.0	7.1	7.7	8.2	9.1	10.6	12.0	12.3	13.4	13.5	13.8	11.7	10.4	8.1	6.4	5.9	5.1	7.8	8.4
Savannah, Ga.	6.5	5.8	5.8	6.0	5.8	5.7	6.1	7.4	7.7	7.4	7.7	8.6	9.5	10.6	11.6	12.1	12.7	11.8	11.0	9.3	8.3	7.8	7.6	7.8	8.4
Seattle, Wash.	4.2	4.2	4.4	4.4	4.4	3.6	3.7	4.0	3.9	4.3	5.1	5.4	6.2	6.5	7.0	7.0	7.2	7.1	7.2	7.0	7.4	6.7	6.3	5.0	5.5
Shreveport, La.	5.8	5.5	5.2	4.7	4.4	4.5	4.1	5.4	6.4	6.9	7.2	7.0	7.3	7.6	7.9	7.3	7.5	7.4	6.9	6.0	5.7	5.2	6.3	6.3	6.2
Sioux City, Iowa.	11.9	11.6	11.3	11.1	11.1	10.4	10.2	10.6	11.2	11.9	13.0	13.4	14.0	15.0	15.9	16.8	17.2	17.4	16.3	14.8	13.2	12.7	12.3	13.2	13.2
Spokane, Wash.	6.1	6.2	6.2	5.8	6.1	6.3	6.1	6.0	6.9	7.0	7.5	7.8	8.3	8.2	8.4	9.3	9.3	8.8	8.8	9.1	8.7	8.4	6.4	5.9	7.4
Springfield, Ill.	7.6	7.7	7.3	7.4	7.2	7.1	7.2	8.1	9.2	10.1	10.2	9.9	10.9	11.5	11.8	11.5	11.3	10.4	10.1	7.2	6.7	6.5	7.3	7.4	8.8
Springfield, Mo.	7.9	8.5	7.9	8.3	8.4	8.3	7.8	7.9	9.4	10.6	11.8	11.6	12.1	11.5	12.1	11.4	10.8	10.5	9.4	8.6	8.4	8.4	8.4	8.5	9.5
Tacoma, Wash.																									
Tampa, Fla.	4.6	4.6	4.6	4.5	4.7	4.9	4.8	6.2	6.7	5.8	5.7	5.5	6.6	6.6	7.1	7.5	7.8	7.7	7.2	6.2	5.3	4.9	4.6	4.7	5.8
Toledo, Ohio.	7.6	7.6	7.5	7.2	6.6	6.8	7.4	8.6	9.8	10.0	10.0	10.4	10.1	11.1	11.2	11.0	10.2	9.6	8.9	7.4	7.1	7.0	7.2	7.3	8.7
Vicksburg, Miss.	5.9	5.7	5.5	4.7	5.2	5.1	4.8	5.0	5.5	5.2	5.4	5.0	5.4	5.7	5.9	6.1	6.6	6.6	6.0	4.9	3.8	3.5	4.4	4.5	4.5	5.2
Vineyard Haven, Mass.	7.2	7.1	7.3	7.0	6.3	6.5	7.3	8.3	8.3	8.7	9.5	10.4	10.6	10.4	10.4	10.2	9.4	8.4	7.7	6.6	6.9	6.8	7.1	7.2	8.2
Walla Walla, Wash.	6.2	6.1	6.2	6.7	6.3	6.1	5.7	5.5	5.5	6.2	7.3	7.5	7.9	7.5	7.3	6.7	6.8	7.0	7.1	7.5	8.0	6.8	6.5	6.5	6.7
Washington, D. C.	4.1	4.4	3.9	3.4	3.5	3.3	3.9	5.9	7.6	7.6	8.3	8.9	8.6	9.1	8.3	8.0	7.3	6.1	5.0	3.8	4.0	4.0	4.0	4.0	5.9
Wichita, Kans.	8.4	8.6	7.8	7.8	7.5	7.5	7.7	8.2	9.3	9.4	10.1	11.1	11.6	11.6	11.8	12.0	11.4	10.5	9.9	9.1	7.7	8.4	9.1	8.7	9.4
Williston, N. Dak.*	9.1	8.8	8.1	7.6	7.8	7.4	8.3	9.3	10.3	11.8	13.9	14.2	15.9	15.7	14.9	15.1	14.6	15.1	16.8	14.1	11.2	10.6	8.7	8.1	11.1
Wilmington, N. C.	5.4	5.5	5.3	5.3	5.3	5.6	6.6	7.7	8.6	8.5	8.6	9.4	9.5	10.2	10.9	10.6	9.9	9.9	8.5	7.8	7.0	6.5	6.0	5.7	7.7
Winnemucca, Nev.	9.2	8.4	8.5	8.5	7.9	7.6	7.4	7.5	8.2	9.4	9.8	9.4	8.8	9.8	10.5	11.3	11.3	11.2	11.2	12.2	12.0	10.5	8.9	8.4	9.5
Woods Hole, Mass.	11.9	12.3	11.7	11.3	11.2	11.6	11.7	12.5	12.6	12.9	13.1	13.5	14.1	15.0	15.2	14.5	14.0	14.4	13.9	12.3	12.0	12.0	12.1	11.8	12.8
Yankton, S. Dak.	7.9	7.6	7.0	6.1	5.9	6.3	6.3	6.8	7.9	8.6	9.3	9.5	10.4	11.0	11.5	12.0	12.3	12.4	11.9	11.1	9.6	9.7	8.5	8.4	9.1
West Indies.																									
Basseterre, St. Kitts.	8.9	8.7	9.1	8.9	8.6	9.3	10.0	10.8	11.4	11.6	11.7	12.0	11.7	11.3	10.7	10.5	9.6	9.3	8.7	9.6	9.4	9.5	9.4	9.1	10.0
Bridgetown, Bar.	5.5	5.7	6.0	6.6	6.5	7.1	10.6	13.0	14.4	14.7	14.9	15.2	14.8	14.1	13.3	12.8	11.3	8.2	6.6	5.7	5.7	5.5	5.4	5.5	9.5
Cienfuegos, Cuba.	5.0	5.9	5.6	5.6	5.8	5.5	5.6	6.1	6.1	6.5	7.2	7.7	8.4	9.3	9.1	8.3	7.1	6.3	5.4	6.1	5.8	5.5	5.7	5.9	6.5
Havana, Cuba.	4.9	4.6	4.6	4.3	4.6	4.5	4.4	6.4	8.5	8.6	9.6	12.3	14.6	14.9	15.4	14.2	12.6	12.5	10.8	9.1	7.7	6.2	5.3	4.6	8.5
Kingston, Jamaica.	4.4	4.8	4.9	5.0	5.4	5.3	4.8	3.9	4.1	5.8	8.8	13.1	15.8	16.2	16.4	14.1	10.9	8.8	5.6	4.0	4.1	4.2	4.3	4.5	7.5
Port of Spain, Trin.	1.5	1.6	1.6	1.8	1.6	1.8	2.6	5.1	6.9	8.0	8.6	8.5	8.7	8.8	8.0	7.9	7.1	5.7	4.3	3.6	2.7	2.1	1.7	1.4	4.6
Roseau, Dominica.	4.5	5.0	4.9	4.9	4.7	4.8	4.1	4.9	5.4	6.2	6.7	7.2	7.2	7.1	6.6	6.1	4.8	4.4	3.7	4.0	4.0	4.0	4.0	4.4	5.2
San Juan, Porto Rico.	3.7	3.5	3.0	2.8	2.2	2.0	2.7	4.7	8.2	10.0	10.8	11.2	11.3	11.1	10.8	10.0	9.5	8.3	8.0	6.5	5.9	5.8	5.2	4.1	6.7
Santiago de Cuba.	3.3	2.8	3.4	3.1	3.0	3.3	3.3	4.7	5.0	4.9	5.7	7.1	8.0	8.0	7.4	6.4	5.1	3.5	3.2	2.9	3.2	3.1	3.0	3.4	4.4
Willemstad, Curaçao.	11.1	10.4	10.3	10.2	10.4	10.3	12.5	14.6	15.4	15.9	16.1	16.2	16.3	16.2	16.4	16.1	15.5	14.3	13.2	13.1	12.7	12.2	11.9	11.4	13.4

*Record for 27 days only.

TABLE VI.—*Resultant winds from observations at 8 a. m. and 8 p. m., daily, during the month of June, 1899.*

Stations.	Component direction from—				Resultant.	
	N.	S.	E.	W.	Direction from—	Duration.
	Hours.	Hours.	Hours.	Hours.	°	Hours.
New England.						
Eastport, Me	18	20	8	21	s. 47 w.	18
Portland, Me	15	27	9	22	s. 47 w.	18
Northfield, Vt	24	28	3	16	s. 73 w.	14
Boston, Mass	11	18	8	33	s. 74 w.	26
Nantucket, Mass	12	28	10	29	s. 50 w.	25
Woods Hole, Mass	12	27	7	27	s. 53 w.	25
Block Island, R. I	14	24	3	36	s. 73 w.	34
New Haven, Conn	22	25	7	20	s. 77 w.	13
Middle Atlantic States.						
Albany, N. Y	15	25	8	21	s. 52 w.	16
Binghamton, N. Y.†	16	7	3	12	n. 45 w.	13
New York, N. Y	17	25	9	25	s. 63 w.	18
Harrisburg, Pa.†	13	4	3	15	n. 53 w.	15
Philadelphia, Pa	24	18	8	19	n. 61 w.	12
Atlantic City, N. J	15	27	14	20	s. 27 w.	13
Cape May, N. J	16	31	12	11	s. 4 e.	15
Baltimore, Md	23	16	15	20	n. 36 w.	9
Washington, D. C	21	24	11	14	s. 56 w.	4
Lynchburg, Va	16	22	16	19	s. 27 w.	7
Norfolk, Va	15	26	21	13	s. 36 e.	14
Richmond, Va	18	22	13	16	s. 37 w.	5
South Atlantic States.						
Charlotte, N. C	20	20	24	12	e.	12
Hatteras, N. C	18	20	10	21	s. 80 w.	1
Raleigh, N. C	18	19	13	19	s. 80 w.	6
Wilmington, N. C	15	22	14	21	s. 45 w.	10
Charleston, S. C	14	27	18	14	s. 17 e.	14
Augusta, Ga	14	26	17	16	s. 5 e.	12
Savannah, Ga	13	31	17	14	s. 9 e.	18
Jacksonville, Fla	11	28	30	15	s. 16 e.	18
Florida Peninsula.						
Jupiter, Fla	6	28	28	9	s. 41 e.	29
Key West, Fla	7	18	41	5	n. 73 e.	38
Tampa, Fla	11	16	32	14	s. 74 e.	19
Eastern Gulf States.						
Atlanta, Ga	21	14	18	23	n. 36 w.	9
Macon, Ga †	10	11	9	7	s. 63 e.	2
Pensacola, Fla.†	11	9	11	10	n. 27 e.	2
Mobile, Ala	22	23	12	11	s. 45 e.	1
Montgomery, Ala	15	23	14	30	s. 37 w.	10
Meridian, Miss.†	8	11	9	9	s.	3
Vicksburg, Miss	15	19	22	16	s. 56 e.	7
New Orleans, La	9	37	23	7	s. 30 e.	33
Western Gulf States.						
Shreveport, La	15	25	27	4	s. 67 e.	25
Fort Smith, Ark	7	17	36	5	s. 72 e.	33
Little Rock, Ark	14	30	18	14	s. 14 e.	16
Corpus Christi, Tex	6	31	38	4	s. 53 e.	42
Fort Worth, Tex †	2	18	9	3	s. 21 e.	17
Galveston, Tex	8	32	40	2	s. 58 e.	45
Palestine, Tex	17	27	28	1	s. 70 e.	29
San Antonio, Tex	15	25	33	5	s. 70 e.	30
Ohio Valley and Tennessee.						
Chattanooga, Tenn	19	22	10	24	s. 78 w.	14
Knoxville, Tenn	23	14	18	21	n. 18 w.	10
Memphis, Tenn	15	28	14	20	s. 25 w.	14
Nashville, Tenn	18	16	12	28	n. 83 w.	16
Lexington, Ky.†	5	10	5	13	s. 58 w.	9
Louisville, Ky	16	27	16	12	s. 20 e.	12
Evansville, Ind.†	6	14	8	8	s.	8
Indianapolis, Ind	19	27	12	14	s. 14 w.	8
Cincinnati, Ohio	15	23	21	17	s. 27 e.	9
Columbus, Ohio	17	22	19	16	s. 31 e.	6
Pittsburg, Pa	28	14	10	20	n. 36 w.	17
Parkersburg, W. Va	18	25	13	15	s. 16 w.	7
Elkins, W. Va	26	17	12	17	n. 29 w.	10
Lower Lake Region.						
Buffalo, N. Y	11	21	7	36	s. 71 w.	31
Oswego, N. Y	9	27	8	29	s. 49 w.	28
Rochester, N. Y	16	20	8	33	s. 81 w.	25
Erie, Pa	13	15	8	38	s. 86 w.	30
Cleveland, Ohio	19	28	15	13	s. 45 e.	3
Sandusky, Ohio	14	24	19	21	s. 11 w.	10
Toledo, Ohio	13	20	17	21	s. 39 w.	6
Detroit, Mich	19	23	13	24	s. 70 w.	12
Upper Lake Region.						
Alpena, Mich	17	21	15	30	s. 75 w.	16
Escanaba, Mich	17	28	14	12	s. 10 e.	11
Grand Haven, Mich	16	24	12	24	s. 56 w.	14
Marquette, Mich	18	25	14	18	s. 39 w.	6
Port Huron, Mich	23	26	8	14	s. 63 w.	7
Sault Ste. Marie, Mich	8	9	23	27	s. 76 w.	4
Chicago, Ill	17	21	24	15	s. 66 e.	10
Milwaukee, Wis.	16	22	15	22	s. 49 w.	9
Green Bay, Wis	13	27	17	18	s. 4 w.	14
Duluth, Minn	25	12	22	21	n. 4 e.	13
North Dakota.						
Moorhead, Minn	12	26	21	21	s.	14
Bismarck, N. Dak	20	9	15	28	n. 50 w.	17
Williston, N. Dak	28	10	12	27	n. 40 w.	23
Upper Mississippi Valley.						
St. Paul, Minn	13	26	22	19	s. 13 e.	13
La Crosse, Wis. †	5	14	10	6	s. 24 e.	10
Davenport, Iowa	17	22	18	16	s. 22 e.	5
Des Moines, Iowa	11	27	17	22	s. 17 w.	17
Dubuque, Iowa	14	27	18	14	s. 17 e.	14
Keokuk, Iowa	13	26	19	14	s. 21 e.	14
Cairo, Ill	15	33	9	18	s. 27 w.	20
Springfield, Ill	12	24	21	16	s. 23 e.	13
Hannibal, Mo.†	6	15	9	6	s. 18 e.	10
St. Louis, Mo	12	30	15	14	s. 3 e.	18
Missouri Valley.						
Columbia, Mo.*	5	16	10	7	s. 15 e.	11
Kansas City, Mo	15	37	26	8	s. 56 e.	22
Springfield, Mo	7	37	24	6	s. 31 e.	35
Lincoln, Nebr	16	31	20	8	s. 39 e.	19
Omaha, Nebr	11	24	28	8	s. 57 e.	24
Sioux City, Iowa†	7	18	6	5	s. 5 e.	11
Pierre, S. Dak	14	25	22	12	s. 42 e.	15
Huron, S. Dak	16	21	26	14	s. 67 e.	13
Yankton, S. Dak †	4	13	8	11	s. 18 w.	10
Northern Slope.						
Havre, Mont	9	13	12	37	s. 81 w.	25
Miles City, Mont	15	18	13	35	s. 76 w.	12
Helena, Mont	9	18	5	39	s. 75 w.	35
Kalispell, Mont	20	17	13	26	n. 77 w.	13
Rapid City, S. Dak	21	12	15	28	n. 55 w.	16
Cheyenne, Wyo	23	17	8	23	n. 68 w.	16
Lander, Wyo	19	20	9	25	s. 87 w.	16
North Platte, Nebr	16	29	15	12	s. 13 e.	13
Middle Slope.						
Denver, Colo	23	22	10	14	n. 76 w.	4
Pueblo, Colo	21	13	20	21	n. 7 w.	8
Concordia, Kans	8	37	16	6	s. 19 e.	31
Dodge, Kans	8	36	26	2	s. 41 e.	37
Wichita, Kans	7	42	18	2	s. 25 e.	38
Oklahoma, Okla	7	41	21	3	s. 25 e.	37
Southern Slope.						
Abilene, Tex	10	36	30	2	s. 47 e.	38
Amarillo, Tex	4	42	13	6	s. 10 e.	39
Southern Plateau.						
El Paso, Tex	25	6	28	19	n. 25 e.	21
Santa Fe, N. Mex	5	30	25	16	s. 20 e.	27
Flagstaff, Ariz	22	12	3	29	n. 69 w.	28
Phenix, Ariz	13	10	27	19	n. 69 e.	8
Yuma, Ariz	5	28	10	28	s. 38 w.	29
Independence, Cal	20	16	11	29	n. 77 w.	18
Middle Plateau.						
Carson City, Nev	16	12	7	36	n. 82 w.	29
Winnemucca, Nev	21	14	15	26	n. 58 w.	13
Salt Lake City, Utah	22	19	20	13	n. 67 e.	8
Grand Junction, Colo	17	16	22	19	n. 72 e.	3
Northern Plateau.						
Baker City, Oreg	26	24	7	15	n. 76 w.	8
Boise, Idaho	15	17	18	26	s. 76 w.	8
Spokane, Wash	4	33	13	21	s. 15 w.	30
Walla Walla, Wash	10	34	7	17	s. 23 w.	26
North Pacific Coast Region.						
Fort Canby, Wash	33	7	2	26	n. 43 w.	35
Neah, Wash	2	2	8	50	w.	42
Port Crescent, Wash.*	0	0	2	28	w.	26
Seattle, Wash	16	20	16	19	s. 37 w.	5
Portland, Oreg	25	17	8	30	n. 70 w.	23
Roseburg, Oreg	41	4	23	13	n. 15 e.	38
Middle Pacific Coast Region.						
Eureka, Cal	29	13	3	33	n. 62 w.	34
Mount Tamalpais, Cal	30	0	0	43	n. 55 w.	52
Red Bluff, Cal	37	12	11	12	n. 2 w.	23
Sacramento, Cal	14	35	10	21	s. 28 w.	24
San Francisco, Cal	1	16	0	52	s. 73 w.	54
South Pacific Coast Region.						
Fresno, Cal	37	3	3	39	n. 47 w.	50
Los Angeles, Cal	3	25	5	42	s. 59 w.	43
San Diego, Cal	19	19	1	36	w.	35
San Luis Obispo, Cal	16	10	5	35	n. 79 w.	31
West Indies.						
Basseterre, St. Kitts Island	9	1	55	0	n. 82 e.	57
Bridgetown, Barbados	5	8	54	0	s. 87 e.	54
Cienfuegos, Cuba	38	6	32	3	n. 42 e.	43
Havana, Cuba	7	10	51	1	s. 87 e.	50
Kingston, Jamaica	49	4	11	6	n. 6 e.	45
Port of Spain, Trinidad	6	6	53	1	e.	52
Roseau, Dominica	26	8	31	9	n. 51 e.	28
San Juan, Porto Rico	0	15	51	1	s. 59 e.	29
Santiago de Cuba, Cuba	37	6	28	5	n. 36 e.	39
Santo Domingo, S. Dom	50	2	8	3	n. 6 e.	48
Willemstad, Curaçao	1	2	59	0	s. 88 e.	58

* From observations at 8 p. m. only.

† From observations at 8 a. m. only.

TABLE VII.—*Thunderstorms and auroras, June*, 1899.

States.	No. of stations.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total. No.	Total. Days.	
Alabama	53	T.	....	....	1	5	2	....	....	3	3	1	....	1	2	1	2	2	1	....	....	....	1	4	6	2	2	....	1	2	2	1	....	45	21	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Arizona	53	T.	3	1	2	...	....	1	....	....	....	....	....	....	....	....	....	....	3	2	8	5	3	12	5	6	6	....	1	4	4	3	....	69	17	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Arkansas	57	T.	5	....	....	1	....	....	3	12	9	2	1	3	3	2	4	....	....	....	....	....	....	1	13	2	9	3	2	12	....	....	....	87	18	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
California	189	T.	2	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	5	2	A.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Colorado	73	T.	...	7	1	3	1	4	6	12	6	1	....	2	2	....	8	3	1	....	5	16	8	10	8	15	10	4	2	3	2	7	..	147	26	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Connecticut	22	T.	....	..	....	....	1	....	4	3	....	....	....	....	....	5	8	....	....	....	1	11	....	....	6	15	7	....	....	9	7	..	....	77	12	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	....	....	3	1	A.
Delaware	5	T.	1	....	....	....	....	....	1	3	3	....	....	....	1	....	3	....	....	....	....	..	1	....	....	....	1	....	....	1	....	....	....	15	9	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	A.
Dist. of Columbia	4	T.	1	....	....	....	....	....	1	....	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	5	5	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Florida	45	T.	8	10	13	8	7	3	1	1	....	1	5	9	3	4	9	10	15	6	1	....	....	7	3	3	3	6	6	6	5	10	...	163	27	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Georgia	54	T.	1	....	2	....	....	....	1	3	1	2	1	1	....	2	1	1	1	....	....	....	....	....	1	1	1	....	1	2	4	1	....	28	19	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Idaho	27	T.	4	2	1	2	1	....	....	....	....	1	2	2	....	....	....	....	....	3	4	2	....	....	1	4	4	2	....	3	2	....	....	40	17	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Illinois	92	T.	22	17	7	15	11	11	9	19	5	1	2	...	2	34	1	....	6	3	4	15	1	10	9	16	3	2	17	6	....	....	....	248	26	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	1	1	A.
Indiana	55	T.	13	...	6	2	2	3	14	9	6	1	4	....	1	6	....	....	....	....	1	10	4	...	....	11	....	....	1	1	....	...	....	95	18	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Indian Territory	8	T.	2	....	....	....	2	....	1	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	8	5	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Iowa	126	T.	...	31	12	17	6	18	6	6	....	....	6	11	21	23	1	6	18	6	4	7	8	16	4	3	2	14	10	....	....	....	....	256	24	T.
		A.	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	A.
Kansas	74	T.	14	22	15	14	8	7	13	19	14	....	....	1	2	14	2	3	....	....	....	....	4	10	8	13	2	2	5	6	1	....	....	199	23	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Kentucky	45	T.	10	....	3	2	5	1	1	9	7	6	4	....	3	6	1	....	....	1	....	2	3	....	2	11	5	....	....	4	1	....	....	87	21	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Louisiana	45	T.	....	....	....	....	6	1	5	2	1	4	2	9	3	5	4	12	2	1	....	....	....	4	6	4	3	1	7	4	4	5	....	95	23	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Maine	17	T.	....	....	....	....	2	3	....	1	....	....	....	....	....	8	4	....	....	2	7	9	4	...	1	1	1	3	1	....	....	....	....	47	14	T.
		A.	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	3	2	A.
Maryland	39	T.	21	3	....	....	2	10	4	9	23	4	....	....	....	....	13	1	....	....	....	4	1	....	1	4	16	....	....	12	1	....	....	129	17	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	2	1	A.
Massachusetts	54	T.	....	....	....	....	2	..	4	3	....	....	....	....	1	12	20	4	....	....	12	24	....	....	2	29	17	....	2	7	5	....	....	144	15	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	10	3	....	13	2	A.
Michigan	107	T.	4	2	20	14	32	31	24	1	....	....	....	12	7	10	2	....	3	8	10	1	5	14	....	4	....	2	1	9	....	....	....	216	22	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	5	2	....	....	8	3	A.
Minnesota	64	T.	1	16	11	6	7	9	3	1	....	6	20	17	10	4	....	....	13	1	5	2	6	1	....	....	1	1	5	2	....	....	....	148	23	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Mississippi	42	T.	....	....	4	2	8	7	6	5	1	4	2	4	4	1	10	5	....	....	....	....	....	....	....	1	1	....	4	6	....	....	12	4	A.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	10	16	7	4	4	3	3	8	6	....	126	23	T.
Missouri	89	T.	14	9	5	13	6	10	13	24	12	1	1	1	4	24	1	7	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	7	14	11	10	10	11	9	1	....	....	220	25	T.
Montana	37	T.	2	3	4	2	5	1	1	1	1	1	2	3	2	3	....	....	....	....	7	5	....	2	....	7	3	3	....	4	1	....	....	1	1	A.
		A.	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	4	3	....	69	23	A.
Nebraska	145	T.	8	18	15	3	1	8	4	8	1	....	1	15	20	18	....	12	2	5	6	8	14	14	7	8	13	15	14	1	1	....	....	4	4	A.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	240	26	T.
Nevada	45	T.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	....	....	....	....	....	....	....	1	....	....	....	1	1	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	2	A.
New Hampshire	20	T.	1	....	....	4	10	1	4	3	....	....	....	....	1	7	7	....	....	....	5	11	....	....	....	6	1	....	....	....	....	....	....	0	0	A.
		A.	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	2	1	....	61	13	T.
New Jersey	50	T.	5	....	....	....	3	6	1	9	8	....	....	....	....	4	20	....	....	....	....	22	4	....	1	13	15	....	....	15	5	....	....	131	15	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	6	....	....	6	1	A.
New Mexico	38	T.	....	....	....	4	....	....	2	....	4	2	....	....	....	....	5	2	....	....	....	4	2	1	4	3	2	....	....	4	2	3	....	44	15	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
New York	103	T.	14	....	....	10	14	5	20	7	...	....	1	2	2	20	25	2	....	....	4	30	4	1	24	17	10	....	1	10	6	....	....	229	22	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	3	17	3	....	24	4	A.
North Carolina	56	T.	20	6	....	3	....	..	3	12	13	15	1	4	5	3	3	4	....	....	....	....	8	....	....	....	6	4	6	7	5	....	....	128	19	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
North Dakota	40	T.	2	6	9	....	2	...	....	....	....	4	3	1	1	2	....	....	....	6	2	4	3	2	3	....	....	3	4	1	2	8	....	68	20	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	3	2	....	....	6	3	A.
Ohio	124	T.	25	....	4	6	16	21	24	11	3	1	1	....	5	14	7	....	....	1	15	27	5	....	....	18	1	....	1	19	....	1	...	226	22	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	1	7	....	....	9	3	A.
Oklahoma	22	T.	2	2	....	6	1	1	1	5	4	2	....	....	....	3	3	....	....	....	....	....	....	....	1	..	1	....	2	2	....	....	....	36	15	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Oregon	71	T.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Pennsylvania	100	T.	31	3	2	1	20	12	18	18	11	2	....	1	1	2	22	....	....	....	4	31	3	2	7	30	6	....	1	30	7	....	...	265	24	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	....	....	....	....	....	....	3	....	....	2	....	....	....	8	3	A.
Rhode Island	8	T.	....	....	....	....	....	....	1	....	....	....	....	....	....	....	1	...	....	1	3	....	....	....	6	5	....	....	3	4	....	....	....	4	1	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	5	....	....	....	25	8	A.
South Carolina	44	T.	10	9	3	....	....	..	1	4	3	3	11	11	2	2	7	7	4	....	....	....	9	....	....	1	1	3	7	13	10	...	....	121	21	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
South Dakota	52	T.	11	10	5	5	5	2	1	....	1	4	10	3	5	1	6	7	....	2	4	3	4	1	2	4	7	9	7	....	1	3	....	123	27	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	13	3	A.
Tennessee	61	T.	10	7	4	6	7	2	4	14	9	9	2	2	5	5	8	1	....	....	....	....	1	1	11	14	9	7	9	12	....	....	....	159	24	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Texas	83	T.	2	2	....	2	5	6	5	1	3	5	....	....	6	3	3	6	4	....	1	....	1	....	1	6	....	2	4	11	4	5	....	88	23	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Utah	34	T.	1	5	5	1	....	1	3	1	....	...	....	....	....	....	....	....	....	1	7	....	....	...	1	2	8	2	....	....	....	2	....	40	14	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Vermont	14	T.	....	....	....	....	5	4	....	1	....	....	....	....	....	7	6	....	....	....	2	5	....	...	1	4	....	3	....	....	....	....	....	38	10	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	2	1	A.
Virginia	47	T.	20	3	....	1	1	1	2	1	15	15	2	....	3	1	5	...	....	....	....	....	5	....	....	....	17	1	1	6	2	1	....	103	20	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Washington	55	T.	1	1	....	....	1	....	....	....	....	1	....	....	1	....	....	....	1	....	2	1	....	....	....	....	3	1	....	1	....	....	....	14	11	T.
		A.	....	1	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	4	4	A.
West Virginia	38	T.	15	2	....	1	6	10	....	7	6	5	1	4	1	4	3	....	....	....	....	9	3	....	2	7	7	3	....	12	4	1	....	113	22	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Wisconsin	60	T.	1	15	13	21	5	19	9	2	....	2	16	16	20	12	...	....	15	12	....	2	5	9	....	....	....	....	15	3	....	....	....	212	20	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	6	8	1	....	15	3	A.
Wyoming	18	T.	1	2	1	....	....	..	....	....	....	....	....	1	....	....	....	....	....	....	7	2	1	....	..	3	1	....	....	....	1	1	....	21	11	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Sums	2,804	T.	308	217	168	180	218	219	294	250	174	106	101	136	149	272	225	97	91	61	129	276	121	139	171	311	223	110	148	261	107	61	....	5,253	....	T.
		A.	3	1	1	0	0	0	1	0	0	0	1	0	0	0	0	1	0	4	1	0	0	0	0	0	4	3	1	38	88	12	....	159	....	A.

TABLE VIII.—*Average hourly sunshine (in percentages), June, 1899.*

Stations.	Instrument.	Percentages for each hour of local mean time ending with the respective hour.																Hours of sunshine.			
		A. M.								P. M.								Total.			
		5	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7	8	Actual.	Possible.	Percent of possible.	Personal estimate.
																		Hours.	*Hours.*		
Albany, N. Y	T.	64	60	61	71	80	83	87	87	92	87	86	84	69	55	61	55	343.3	459.9	75	44
Atlanta, Ga	T.	68	67	71	80	88	84	87	84	84	88	82	74	59	59	57	53	326.3	431.5	76	54
Atlantic City, N. J	P.	66	67	67	64	69	78	78	72	72	74	78	79	74	59	37	37	303.3	445.9	68	56
Baltimore, Md	T.	44	43	53	62	73	80	82	82	86	73	72	74	63	45	30	33	285.2	445.9	64	55
Binghamton, N. Y	T.	27	30	57	79	83	85	89	86	87	79	75	67	68	62	49	42	311.1	456.2	68	50
Bismarck, N. Dak	P.	44	48	62	70	61	66	73	58	56	66	72	77	73	61	57	55	296.8	475.6	62	53
Boise, Idaho	P.	60	66	77	77	84	89	82	81	83	83	77	77	70	68	63	63	350.4	463.5	76	67
Boston, Mass	T.	54	55	62	73	83	91	94	91	87	82	75	68	60	56	45	41	323.4	456.2	71	55
Buffalo, N. Y	T.	47	48	63	83	86	84	88	92	98	99	99	89	77	73	65	55	363.0	459.9	79	50
Charleston, S. C	T.	62	60	65	47	61	69	58	71	74	75	73	64	58	54	41	35	265.9	428.7	62	60
Chattanooga, Tenn	T.	51	50	50	55	69	73	73	78	82	77	76	69	70	63	52	57	288.7	434.3	66	53
Cheyenne, Wyo	P.	49	62	75	78	78	78	74	67	71	65	58	59	63	64	50	29	294.9	451.9	65	51
Chicago, Ill	T.	54	57	67	78	85	87	89	87	86	80	78	74	70	51	37	43	325.1	456.2	71	63
Cincinnati, Ohio	T.	63	63	62	62	75	89	92	96	93	93	94	90	84	69	61	55	351.9	445.9	79	64
Cleveland, Ohio	T.	53	53	55	54	69	82	83	76	85	86	90	88	80	71	63	64	321.4	456.2	73	68
Columbia, Mo	T.	52	53	72	86	83	85	93	99	99	98	93	93	91	84	64	50	371.0	445.9	83	49
Columbus, Ohio	T.	51	53	58	63	71	82	84	82	81	86	82	74	67	51	50	51	310.4	449.0	69	61
Denver, Colo	P.	66	74	82	80	83	89	85	78	76	88	83	77	67	61	46	41	334.8	449.0	75	65
Des Moines, Iowa	T.	23	23	24	30	44	56	59	66	68	62	66	53	46	47	43	37	216.9	456.2	48	44
Detroit, Mich	T.	50	51	66	81	92	90	91	91	92	95	95	87	87	80	59	49	365.4	456.2	80	68
Dodge, Kans	P.	30	39	56	62	61	70	74	74	80	84	82	82	70	57	39	35	286.3	443.1	65	60
Dubuque, Iowa	T.	44	42	42	52	65	81	86	86	82	77	73	69	65	61	50	51	296.7	456.2	65	59
Eastport, Me	P.	23	28	37	41	50	58	63	62	59	72	69	60	53	48	42	35	236.1	466.7	51	34
Elkins, W. Va	T.	7	7	13	35	60	67	73	88	79	82	79	71	63	41	8	8	231.6	445.9	52	42
Erie, Pa	T.	46	47	51	59	70	79	81	81	82	84	87	87	78	77	68	66	329.7	456.2	72	60
Escanaba, Mich	T.	30	30	31	46	59	59	65	59	55	50	43	44	34	16	7	7	188.9	471.8	40	40
Eureka, Cal	P.	23	27	39	43	52	61	73	78	89	88	87	87	78	75	73	72	300.3	451.9	66	70
Fresno, Cal	T.	84	83	85	90	93	95	99	100	99	97	96	94	90	90	87	88	406.7	440.2	92	87
Galveston, Tex	P.	.....	26	51	61	66	67	65	60	73	80	78	74	66	52	31	50	255.1	419.0	61	42
Grand Junction, Colo	P.	84	83	77	79	87	83	80	81	76	79	82	82	79	73	75	90	357.1	445.9	80	68
Harrisburg, Pa	T.	43	43	47	57	74	80	86	83	83	80	75	61	62	49	44	50	290.9	449.0	65	50
Helena, Mont	P.	57	66	70	71	80	82	74	63	74	76	77	75	73	65	64	56	335.0	475.6	70	46
Huron, S. Dak	T.	64	63	60	53	72	74	82	88	85	78	71	72	56	45	50	52	310.0	468.5	67	58
Indianapolis, Ind	T.	60	60	58	65	72	86	89	89	88	79	76	72	62	52	50	50	315.5	449.0	70	57
Jacksonville, Fla	T.	83	74	77	83	90	89	88	85	86	81	72	76	66	47	24	25	311.6	420.9	74	56
Kalispel, Mont	T.	20	31	54	74	77	84	88	92	88	84	86	83	78	64	44	34	324.1	479.8	68	41
Kansas City, Mo	P.	37	35	49	50	62	61	59	55	52	69	69	66	67	61	57	65	256.8	445.9	58	49
Key West, Fla	T.	.....	17	33	56	66	69	80	79	78	72	62	61	50	34	20	.....	230.7	410.2	56	50
Knoxville, Tenn	T.	34	33	35	50	68	78	82	83	90	89	82	77	72	62	41	39	288.8	437.2	66	64
Lexington, Ky	T.	42	48	66	80	81	80	82	93	93	90	91	87	82	72	58	50	341.3	443.1	77	63
Little Rock, Ark	T.	53	53	55	61	64	69	82	87	84	80	79	72	68	54	47	51	293.8	434.3	68	59
Los Angeles, Cal	P.	23	28	33	37	42	57	69	79	84	92	93	94	93	85	63	62	289.0	431.5	67	56
Louisville, Ky	T.	63	63	62	60	66	79	73	76	83	81	80	75	63	57	53	54	305.6	443.1	69	53
Macon, Ga	T.	47	46	79	89	91	94	94	94	94	94	86	82	70	61	51	44	341.7	428.7	80	56
Meridian, Miss	T.	42	40	43	48	58	69	72	76	78	69	68	53	48	45	47	38	246.7	425.8	58	49
Minneapolis, Minn	T.	17	17	24	39	51	61	64	67	71	69	68	60	51	40	33	34	226.0	466.7	48	.....
Mount Tamalpais, Cal	P.	84	84	87	87	86	87	87	89	95	99	97	97	97	98	96	78	404.5	443.1	91	82
Nashville, Tenn	T.	46	47	51	66	82	80	88	84	83	87	79	78	69	50	40	44	302.6	437.2	69	55
New Orleans, La	T.	83	83	84	83	84	83	85	90	84	75	78	74	66	47	41	38	317.5	420.9	75	60
New York, N. Y	T.	49	49	59	76	82	89	92	91	89	89	81	76	70	52	46	49	328.2	451.9	73	51
Northfield, Vt	P.	36	43	55	64	66	65	71	63	57	67	63	63	56	56	40	41	265.5	463.5	57	44
Oklahoma, Okla	T.	49	51	56	62	65	76	69	72	81	86	86	88	80	81	64	68	313.5	434.3	72	60
Omaha, Nebr.*	P.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	48
Parkersburg, W. Va	T.	43	43	44	54	62	69	73	79	77	76	71	64	63	49	33	34	267.4	445.9	60	63
Phenix, Ariz	P.	83	84	86	89	94	95	97	96	89	89	89	89	88	86	87	84	384.6	428.7	90	79
Philadelphia, Pa	T.	47	48	65	77	85	92	88	89	91	95	93	83	71	55	48	48	338.0	449.0	75	46
Pittsburg, Pa	T.	57	57	61	68	79	80	86	82	85	88	85	78	74	66	54	52	329.7	451.9	73	65
Portland, Me	T.	40	45	65	67	73	72	76	83	91	93	87	70	69	65	43	23	313.2	463.5	68	49
Portland, Oreg	T.	34	34	41	46	54	54	62	67	71	78	69	65	59	55	44	43	258.2	471.7	55	48
Raleigh, N. C	T.	46	49	62	82	84	87	88	91	92	86	85	80	74	60	44	49	326.5	437.2	75	54
Rochester, N. Y	T.	57	64	75	86	91	89	94	98	95	100	95	94	84	74	56	39	377.3	459.9	82	72
St. Louis, Mo	T.	64	63	73	77	89	92	92	94	92	85	82	77	77	74	63	56	355.0	445.9	80	58
St. Paul, Minn	P.	37	41	44	52	61	60	55	58	59	62	68	66	64	59	60	54	263.8	466.7	57	48
Salt Lake City, Utah	P.	64	69	77	79	84	87	85	89	90	86	83	87	87	80	64	55	362.5	451.9	80	74
San Diego, Cal	P.	11	10	9	24	42	52	66	70	74	74	78	77	72	64	38	37	227.6	428.7	53	55
San Francisco, Cal	T.	53	56	60	69	83	98	99	97	100	100	100	100	98	86	79	77	382.4	443.1	86	80
Santa Fe, N. Mex	P.	80	86	95	99	100	98	92	90	90	82	80	72	75	71	68	66	372.2	437.2	85	70
Savannah, Ga	T.	79	79	78	86	89	89	90	90	90	83	89	86	71	60	59	55	345.7	425.8	81	61
Seattle, Wash	T.	24	24	28	33	44	51	56	66	67	65	57	56	51	34	9	10	202.6	479.8	42	39
Spokane, Wash	T.	20	29	53	60	74	76	76	77	79	80	83	70	58	63	44	11	286.5	479.8	60	37
Tacoma, Wash	T.	34	31	43	53	66	70	78	72	77	78	79	75	66	64	46	43	293.9	475.6	62	.....
Tampa, Fla.*	T.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	38
Topeka, Kans	T.	37	37	38	44	55	62	69	66	67	71	70	67	63	55	44	43	255.0	445.9	57	48
Vicksburg, Miss	T.	18	17	21	58	71	81	86	87	88	87	85	71	60	52	30	28	268.8	425.8	63	62
Washington, D. C	P.	66	67	70	77	75	80	77	78	68	74	74	78	77	74	69	70	328.8	445.9	74	62
Wilmington, N. C	T.	38	37	50	68	77	80	85	87	83	77	69	56	57	39	27	24	271.0	431.5	63	56
Yankton, S. Dak	T.	37	41	48	62	70	82	81	82	86	84	79	80	67	66	58	47	312.3	459.9	68	54
Basseterre, St. Kitts	T.	.....	4	15	57	77	87	96	93	93	96	88	77	67	20	0	.....	260.5	394.7	66	40
Bridgetown, Barbados	T.	.....	31	50	58	77	85	86	80	77	79	70	60	55	43	24	.....	253.5	387.0	66	35
Cienfuegos, Cuba	T.	.....	63	63	67	79	95	95	94	89	78	57	29	10	7	7	.....	244.3	404.0	60	60
Havana, Cuba	T.	.....	30	30	30	44	57	62	66	56	45	39	37	27	33	33	.....	172.5	406.8	42	41
Kingston, Jamaica, W. I	T.	.....	59	60	69	88	91	83	82	79	69	57	43	48	33	25	.....	255.5	396.0	65	35
Port of Spain, Trinidad, W. I	T.	.....	51	51	64	75	79	84	81	76	77	69	52	41	28	31	.....	242.5	384.0	63	38
Roseau, Dominica, W. I	T.	.....	3	4	34	48	57	54	45	63	66	62	63	44	29	27	.....	175.3	390.0	45	44
San Juan, Porto Rico	T.	.....	21	59	80	93	98	91	88	85	81	73	59	55	42	16	.....	278.0	396.0	70	47
Santiago de Cuba, Cuba	T.	.....	90	85	75	84	75	73	58	68	74	53	39	18	10	3	.....	231.8	400.4	58	37
Santo Domingo, Santo Domingo	T.	.....	48	50	44	47	60	57	61	59	61	39	19	18	23	26	.....	174.8	396.0	44	43
Willemstad, Curaçao	T.	.....	11	30	69	82	94	98	95	95	97	96	93	76	58	51	.....	302.9	384.2	79	48

*Record incomplete.

TABLE IX.—*Accumulated amounts of precipitation for each 5 minutes, for storms in which the rate of fall equaled or exceeded 0.25 in any 5 minutes, or 0.75 in 1 hour during June, 1899, at all stations furnished with self-registering gauges.*

Stations.	Date.	Total duration.		Total am't of precipitation.	Excessive rate.		Amount before excessive began.	Depths of precipitation (in inches) during periods of time as indicated.													
		From—	To—		Began—	Ended—		5 min.	10 min.	15 min.	20 min.	25 min.	30 min.	35 min.	40 min.	45 min.	50 min.	60 min.	80 min.	100 min.	120 min.
	1	2	3	4	5	6	7														
Albany, N. Y.	24			0.40							0.40										
Atlanta, Ga.	29			0.58														0.58			
Atlantic City, N. J.	9			0.50														0.45			
Baltimore, Md.	10			0.57														0.38			
Binghamton, N. Y.	1			0.49														0.43			
Bismarck, N. Dak.	2-3			2.75														0.57			
Boise, Idaho	2			0.25														0.13			
Boston, Mass.	28			0.66														0.36			
Buffalo, N. Y.	1			0.28														0.25			
Cairo, Ill.	8	1.38 p. m.	5.00 p. m.	1.08	1.46 p. m.	2.04 p. m.	T.	0.32	0.58	0.78	0.86										
	13	6.45 a. m.	3.00 p. m.	3.46	11.55 a. m.	1.50 p. m.	0.81	0.10	0.31	0.62	0.98	1.28	1.50	1.68	1.86	2.05	2.39	2.48			
Charleston, S. C.	21	5.58 p. m.	9.09 p. m.	1.40	7.00 p. m.	7.40 p. m.	0.43	0.10	0.20	0.25	0.25	0.45	0.63	0.73	0.83	0.87	0.91	0.95			
Chicago*																					
Cincinnati, Ohio	24			1.30														0.73			
Cleveland, Ohio	28			0.45								0.37									
Columbia, Mo.	25	5.16 p. m.	6.20 p. m.	1.55	5.16 p. m.	5.50 p. m.	0.00	0.08	0.52	0.95	1.28	1.37	1.41	1.52	1.55						
Columbus, Ohio	1			0.54														0.30			
Denver, Colo.	9			0.27														0.16			
Des Moines, Iowa	26	12.15 p. m.	6.12 p. m.	1.38	1.18 p. m.	1.45 p. m.	0.26	0.27	0.45	0.65	0.83	0.93	0.95								
Detroit, Mich.	6			0.54														0.50			
Dodge, Kans.	2-3	7.40 p. m.	D. N.	2.89	9.25 p. m.	10.15 p. m.	0.05	0.17	0.32	0.37	0.41	0.52	0.74	0.91	0.96	1.03					
	7-8	4.05 p. m.	4.15 a. m.	5.77	4.05 p. m.	5.25 p. m.	0.00	0.10	0.30	0.47	0.57	0.62	0.68	0.85	1.15	1.50	1.75	2.18	3.00		
					8.00 p. m.	8.30 p. m.	3.66	0.30	0.65	0.87	0.95	1.10	1.19								
Duluth, Minn.	27-28	8.10 p. m.	8.25 a. m.	2.80	9.40 p. m.	10.10 p. m.	0.10	0.05	0.26	0.50	0.68	0.90	1.05								
Eastport, Me.	15	4.20 p. m.	9.00 p. m.	1.04	4.35 p. m.	5.00 p. m.	T.	0.07	0.25	0.39	0.52	0.76									
Elkins, W. Va.	28	9.35 p. m.	D. N.	1.35	9.45 p. m.	10.00 p. m.	T.	0.25	0.59	0.64	0.67										
Erie, Pa.	28			0.78														0.43			
Escanaba, Mich.	27-28			0.95														0.39			
Fort Worth, Tex.	28-30			1.58														0.17			
Fresno, Cal.	25			0.06														0.06			
Galveston, Tex.	26-27	2.11 p. m.	5.07 p. m.	3.01	3.03 a. m.	4.23 a. m.	0.79	0.09	0.12	0.20	0.30	0.41	0.53	0.65	0.68	0.69	0.71	0.75	1.10	1.19	1.27
Grand Junction, Colo.	25-26			0.94														0.30			
Hannibal, Mo.	8			0.45														0.40			
Harrisburg, Pa.	7	2.48 p. m.	3.27 p. m.	0.49	2.44 p. m.	2.57 p. m.	0.01	0.22	0.37	0.46											
Hatteras, N. C.	16			0.27														0.25			
Huron, S. Dak.	4			0.65														0.50			
Indianapolis, Ind.	20			0.68														0.54			
Jacksonville, Fla.	2	5.50 p. m.	7.25 p. m.	1.64	6.05 p. m.	6.35 p. m.	T.	0.13	0.51	0.92	1.23	1.45	1.56								
Jupiter, Fla.	24	6.20 a. m.	7.50 a. m.	1.01	6.25 a. m.	7.05 a. m.	0.02	0.19	0.47	0.62	0.65	0.68	0.70	0.77	0.92	0.97					
Kansas City, Mo.	7			0.37								0.37									
Key West, Fla. †	22	12.08 p. m.	12.50 p. m.	1.20	12.15 p. m.	12.40 p. m.	T.	0.10	0.40	1.05	1.16	1.20									
Knoxville, Tenn.	12			0.84														0.55			
Lexington, Ky.	9-10			1.10														0.65			
Lincoln, Nebr.	2	2.09 p. m.	3.43 p. m.	0.83	2.18 p. m.	2.35 p. m.	T.	0.23	0.61	0.72	0.75	0.77									
	13-14	9.57 p. m.	D. N.	1.00	10.00 p. m.	10.20 p. m.	0.01	0.25	0.50	0.66	0.73	0.74									
	21-22	7.50 p. m.	9.55 a. m.	2.40	8.15 a. m.	9.15 a. m.	1.23	0.08	0.16	0.30	0.35	0.48	0.62	0.75	0.87	0.95	0.99	1.05			
Little Rock, Ark.	8			0.51							0.51										
Los Angeles, Cal.	1			0.57														0.22			
Louisville, Ky.	24			0.50														0.49			
Macon, Ga.	12			0.45									0.45								
Memphis, Tenn.	23	2.55 p. m.	6.30 p. m.	1.37	3.15 p. m.	3.42 p. m.	0.01	0.25†	0.50†	0.74	0.95	1.10	1.13								
Meridian, Miss*																					
Milwaukee, Wis.	12	3.55 a. m.	5.30 a. m.	1.12	4.05 a. m.	5.00 a. m.	0.05	0.07	0.11	0.26	0.55	0.65	0.76	0.80	0.85	0.90	0.96	1.04			
Montgomery, Ala.	25			0.75														0.63			
Nantucket, Mass*																					
Nashville, Tenn.	28	2.53 p. m.	3.30 p. m.	0.52	2.53 p. m.	3.03 p. m.	0.00	0.26	0.51	0.52											
New Orleans, La.	10-11	9.50 a. m.	10.25 a. m.	3.68	7.10 a. m.	7.35 a. m.	2.66	0.14	0.31	0.50	0.55	0.68	0.71								
New York, N. Y.	25			0.54														0.46			
Norfolk, Va.	1-2	8.30 p. m.	1.45 a. m.	1.89	9.27 p. m.	10.00 p. m.	0.61	0.25	0.57	0.78	0.86	0.92	1.01	1.09							
	9	9.00 p. m.	11.59 p. m.	1.36	9.13 p. m.	9.35 p. m.	0.01	0.60	0.89	1.08	1.14	1.18	1.19	1.20							
	10	3.45 p. m.	6.15 p. m.	1.12	3.50 p. m.	4.15 p. m.	T.	0.38	0.63	0.78	0.86	0.95	0.98	0.99							
Northfield, Vt.	26			0.45														0.45			
Oklahoma, Okla.	14-15	10.25 p. m.	10.00 a. m.	1.82	6.30 a. m.	6.40 a. m.	1.02	0.36	0.53	0.56	0.58	0.61	0.64								
Omaha, Nebr.	21-22			1.13														0.35			
Parkersburg, W. Va.	24			0.60														0.49			
Philadelphia, Pa.	20			0.23														0.23			
Pittsburg, Pa.	28	6.15 p. m.	7.50 p. m.	1.00	6.20 p. m.	6.35 p. m.	T.	0.22	0.66	0.73	0.74										
Portland, Me.	19			0.17								0.16									
Portland, Oreg.	25-26			0.27														0.12			
Raleigh, N. C.	9	5.20 p. m.	7.20 p. m.	1.71	5.35 p. m.	6.10 p. m.	0.07	0.10	0.32	0.60	0.85	1.20	1.36	1.52							
	26	11.30 a. m.	1.20 p. m.	0.92	11.30 a. m.	12.00 m.	0.00	0.16	0.21	0.26	0.36	0.68	0.86								
Richmond, Va.	12			0.91														0.28			
Rochester, N. Y.	13	9.35 p. m.	10.45 p. m.	1.08	9.47 p. m.	10.27 p. m.	0.04	0.56	0.66	0.67	0.68	0.68	0.68	0.68	0.68	0.90	1.08				
St. Louis, Mo.	8	12.48 p. m.	3.50 p. m.	0.52	1.19 p. m.	1.50 p. m.	0.01	0.20	0.31	0.35	0.39	0.41	0.43								
	14	7.51 p. m.	10.20 p. m.	0.72	7.54 p. m.	8.10 p. m.	T.	0.27	0.47	0.57											
St. Paul, Minn.	12	6.45 p. m.	8.50 p. m.	2.31	6.58 p. m.	8.10 p. m.	T.	0.26	0.36	0.50	0.76	0.95	1.05	1.20	1.38	1.55	1.62	1.95	2.29		
Salt Lake City, Utah.	4			0.35														0.24			
San Diego, Cal.	1			0.23														0.10			
San Francisco, Cal.	1			0.01														0.01			
Savannah, Ga.	1			0.30														0.29			
Seattle, Wash.	26			0.27														0.27			
Spokane, Wash.	25			0.21														0.10			
Tampa, Fla.	3	12.46 p. m.	4.00 p. m.	1.74	1.40 p. m.	2.25 p. m.	0.46	0.13	0.34	0.53	0.62	0.74	0.81	0.89							
	4	4.10 p. m.	8.16 p. m.	1.20	4.22 p. m.	4.46 p. m.	0.05	0.06	0.13	0.25	0.55	0.65									
	5	4.15 p. m.	5.46 p. m.	0.79	4.50 p. m.	5.05 p. m.	0.15	0.20	0.40	0.50	0.54										
	13	9.27 p. m.	10.40 p. m.	1.16	9.27 p. m.	9.45 p. m.	0.00	0.40	0.80	1.10											
	17-18	9.45 p. m.	2.30 a. m.	1.71	9.45 p. m.	10.20 p. m.	0.00	0.10	0.29	0.45	0.59	0.75	0.89	1.01							
	30	4.41 p. m.	8.55 p. m.	1.52	4.41 p. m.	5.00 p. m.	0.00	0.07	0.25	0.46	0.66										
Vicksburg, Miss.	8	9.15 p. m.	11.55 p. m.	1.16	9.23 p. m.	10.00 p. m.	T.	0.05	0.12	0.33	0.66	0.83	0.92	0.97	1.00						
	15	9.20 p. m.	11.10 p. m.	1.11	9.30 p. m.	10.30 p. m.	0.01	0.06	0.21	0.35	0.38	0.41	0.44	0.50	0.68	0.87	0.99	1.07			
Washington, D. C.	25			0.81														0.37			
Wilmington, N. C.	21	3.28 p. m.	6.05 p. m.	1.37	3.28 p. m.	4.00 p. m.	0.00	0.15	0.42	0.64	0.89	1.04	1.10	1.14	1.17	1.20	1.23	1.33			
	29	2.15 p. m.	4.25 p. m.	1.00	2.20 p. m.	2.45 p. m.	0.03	0.11	0.30	0.54	0.72	0.88	0.91								
Yankton, S. Dak.	25			0.53														0.48			
Basseterre, St. Kitts	25			0.35														0.30			
Bridgetown, Barbados	30	1.59 p. m.	6.20 p. m.	0.90	2.13 p. m.	2.35 p. m.	T.	0.25	0.41	0.63	0.73	0.75									
Cienfuegos, Cuba	21	12.40 p. m.	5.25 p. m.	2.59	12.40 p. m.	2.40 p. m.	0.00	0.03	0.15	0.34	0.42	0.59	0.76	0.84	0.89	1.07	1.27	1.37	1.57	1.91	2.21
	28	7.10 p. m.	10.20 p. m.	1.51	7.30 p. m.	8.10 p. m.	0.04	0.20	0.40	0.61	0.82	1.00	1.22	1.31	1.36	1.39	1.40	1.43			
Havana, Cuba	9	3.15 p. m.	5.05 p. m.	0.61	3.20 p. m.	3.50 p. m.	T.	0.04	0.08	0.15	0.39	0.53	0.58								
Kingston, Jamaica	22			0.34										0.34							
Port of Spain, Trin.	19	10.35 a. m.	2.35 p. m.	1.56	11.40 a. m.	12.15 p. m.	0.06	0.17	0.23	0.31	0.59	0.87	1.05	1.13	1.18	1.19	1.20	1.33			

TABLE IX.—*Accumulated amounts of precipitation for each 5 minutes, etc.*—Continued.

Stations.	Date.	Total duration.		Total am't of precipitation.	Excessive rate.		Amount before excessive began.	Depths of precipitation (in inches) during periods of time as indicated.													
		From—	To—		Began—	Ended—		5 min.	10 min.	15 min.	20 min.	25 min.	30 min.	35 min.	40 min.	45 min.	50 min.	60 min.	80 min.	100 min.	120 min.
	1	2	3	4	5	6	7														
Roseau, Dominica, W.I.	30	.....	.....	0.54	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.43	.....	.....	.....
San Juan, Porto Rico..	16	2.23 p. m.	3.27 p. m.	1.02	2.47 p. m.	3.20 p. m.	0.10	0.23	0.46	0.63	0.65	0.79	0.96	.....	.....	.....	.....	.....	.....	.....	.....
Santiago de Cuba	6	.....	....	0.86	.....	.....	.....	.....	.....	....	....	0.48	.....	.....	.....	.....	.....	.....	.....	.....	.....
Santo Domingo.....	3	....	.....	1.01	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.69	.....	.....	.....
Willemstad, Curaçao..	27	.....	.....	0.16	.....	.....	.....	.....	.....	0.16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

*Record incomplete †Partly estimated.

TABLE X.—*Excessive precipitation, by stations, for June, 1899.*

Stations.	Monthly rainfall 10 inches, or more	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Alabama.	*Inches.*	*Inches.*		*Ins.*	*h.m.*	
Alco		3.26	11			
Daphne		6.00	10-11			
Mobile		4.06	11			
Uniontown		2.50	29			
Wilson		4.00	11			
Arkansas						
Dallas				1.51	1 00	10
Fort Smith		4.17	7			
Moore				1.30	1 00	23
Pocahontas		2.55	13			
Connecticut.						
Canton				1.72	1 00	20
West Simsbury				1.49	1 20	20
Florida.						
Brooksville				1.00	1 00	4
Do				2.00	1 00	17
Do				1.00	0 30	27
Do				1.46	1 00	29
Defuniak Springs		4.00	11			
Eustis		3.42	17			
Jacksonville				1.55	0 30	2
Jasper		2.50	17			
Key West				1.20	0 42	22
Macclenny		2.95	30			
Plant City	11.57	3.82	17-18			
St. Francis		5.50	27			
St. Francis Barracks		2.50	17-18			
Tallahassee		2.96	17			
Tampa	12.18			1.15	1 00	3
Do				1.10	0 17	13
Do				1.00	0 35	17
Georgia.						
Augusta		2.50	16-17			
Blakely		3.90	29			
Fort Gaines				1.60	0 30	24
Greenbush				1.19	1 00	26
Hephzibah				2.10	1 45	29
Thomasville		3.84	17			
Waynesboro		3.20	16-17			
Illinois.						
Cairo		3.46	13	2.58	1 03	13
Dwight				1.10	1 00	14
Do				2.36	0 50	26
Lanark				1.06	0 55	27
Morrisonville				1.11	1 00	8
St. John		2.75	9			
Winchester				1.51	1 00	14
Indiana.						
Butlerville				1.13	1 00	3
Huntington				2.25	0 30	1
Paoli				1.02	0 30	1
Rockville		3.00	1	3.00	3 00	1
Vevay		3.00	8			
Vincennes		2.50	15			
Indian Territory.						
Ryan				1.00	0 30	5
Iowa.						
Alta		2.91	25-26			
Ames		3.71	20			
Do (near)		2.65	20			
Audubon		2.55	13			
Bancroft		2.76	13			
Belknap		2.50	14			
Britt				2.35	2 00	13
Carroll		2.54	12			
Carson		2.71	13			
Clear Lake		2.90	6			
Denison		3.10	13			
Des Moines				1.06	1 00	26
Dows		3.87	13-14			
Forest City		2.60	12-13			
Greene		3.00	14			
Grinnell (near)				1.04	1 00	2
Hampton		3.50	13			
Harlan		2.71	13-14			
Lacona				1.00	1 00	26
Logan	11.99	6.33	13-14			
Maple Valley	11.32	5.21	26	4.81	2 00	26
Mason City	11.05	5.20	14			
Northwood		2.90	13			
Osage		3.78	13-14	1.59	1 00	13
Ottumwa				1.96	1 55	14
Ruthven		2.90	2			
Sac City		7.74	26	7.74	4 30	26
Spirit Lake	10.39	3.93	2			
Storm Lake		2.69	13			
Tara		3.50	17	3.50	1 00	17
Toledo				1.20	1 00	22
Washta		2.71	26			
Waterloo		3.67	13-14			
Waverly		3.53	13-14			
Kansas.						
Burlington		3.82	1			
Colby				1.10	0 40	7
Dodge	11.17	2.93	2-3	1.10	0 50	2
Do		6.05	7-8	3.00	1 20	8
Do				1.20	0 38	8
Ellinwood	11.10	3.82	2-3			
Englewood		2.56	2-3			
Garfield		3.15	2-3			

TABLE X.—*Excessive precipitation*—Continued.

Stations.	Monthly rainfall 10 inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Kansas—Continued.	*Inches.*	*Inches.*		*Ins.*	*h.m.*	
Garfield		2.73	23	1.50	0 45	23
Halstead		3.25	8			
Hutchinson		2.70	8			
Lakin		2.50	23			
Manhattan		2.72	22-23			
Medicine Lodge		4.34	7-8			
Minneapolis		3.23	2-3			
Mount Hope		2.75	8			
Newton		3.40	2			
Norwich		3.26	8-9			
Rome		2.71	8-9			
Salina		2.50	3			
Kentucky.						
Alpha				1.35	0 25	14
Maysville				1.00	1 00	20
Vanceburg		2.58	24			
Louisiana.						
Abbeville		3.30	10			
Amite		4.00	10-11			
Covington		2.55	10-11			
Donaldsonville		5.00	10			
Emilie		4.15	10-11			
Franklin		2.65	11	1.39	0 30	25
Houma				1.01	0 55	29
Jeanerette				1.30	1 15	14
Do				2.10	1 50	16
Jennings		2.76	16			
Lawrence	10.91	3.50	10			
Meiville				2.00	0 30	25
Minden				1.37	1 00	16
Monroe				1.06	0 50	15
New Iberia	10.90	4.35	5	4.35	1 50	5
Do				1.00	0 35	14
New Orleans		3.68	10-11			
Oxford		2.80	12			
Paincourtville		6.81	10			
Port Eads		4.74	10-11			
Rayne		2.63	9			
Sugar Ex. Station	13.33	4.00	10-11			
Wallace		3.77	11			
Massachusetts.						
Leeds		2.87	15	2.04	0 30	15
Winchendon				1.40	0 20	15
Woods Hole				1.00	1 00	29
Michigan.						
Cheboygan		2.63	28			
Mount Clemens		3.00	18	3.00	1 00	18
Newberry				1.40	0 50	4
Thomaston		5.00	11-12			
West Harrisville		2.71	18			
Minnesota.						
Blooming Prairie	10.30	2.80	2			
Do		4.00	11			
Brainerd				1.50	1 00	17
Caledonia				1.45	0 50	17
Detroit City		2.60	11			
Duluth		3.15	27-28	1.17	1 00	27
Faribault		3.86	11			
Grand Meadow	12.05	2.70	11			
Do		3.75	13			
Minneapolis				2.29	1 00	12
Minnesota City	14.35	8.00	11-12			
Park Rapids		2.82	27			
Pleasant Mounds	12.77	3.64	11-12			
Do		3.20	26			
Rolling Green		3.58	2			
St. Charles	13.23	5.30	11			
Do		2.51	13			
St. Paul		2.54	12-13	2.29	1 20	12
Wabasha		2.73	11-12			
Willow River		2.97	27			
Winnebago City	13.91	3.69	3			
Do		3.10	11			
Worthington		2.95	2			
Mississippi.						
Aberdeen				1.22	1 00	29
Americus		3.65	11			
Bay St. Louis		4.38	10			
Biloxi		2.70	25			
Greenville				1.13	1 00	10
Logtown		2.92	10			
Vicksburg				1.04	1 00	8
Do				1.07	1 00	15
Missouri.						
Arthur		2.91	8-9			
Columbia				1.55	0 40	25
Houstonia (near)		2.84	15			
Ironton				1.20	0 35	9
Do				1.52	1 30	25
Mount Vernon		4.24	14			
Neosho		2.75	14			
Richmond				1.25	1 00	2
Nebraska.						
Ashland	10.65			1.32	1 00	14
Blair	10.55	4.21	13-14			
Bluehill		3.65	12	3.65	3 30	12
Bradshaw		2.75	12			
Callaway				1.10	1 00	25
Chester		3.10	7			
Ericson		2.70	26-27			

TABLE X.—*Excessive precipitation.*—Continued.

Stations.	Monthly rainfall 10 inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Nebraska—Continued.	*Inches.*	*Inches.*		*Ins.*	*h.m.*	
Fremont	10.17	2.68	12-13	.....	.....	.....
Grand Island	.....	.....	.....	1.10	0 45	8
Hartington	.....	3.68	26	.....	.....	.....
Hebron	.....	2.74	6	.....	.....	.....
Hooper	.....	4.50	12-13	.....	.....	.....
Kearney	.....	4.60	25	.....	.....	.....
Lexington	.....	.....	.....	2.45	1 15	25
Lincoln (Weather Bureau)	.....	.....	.....	1.00	0 48	22
Do *b*	.....	2.78	22	.....	.....	.....
Do *d*	.....	.....	.....	2.07	0 45	22
Loup	.....	.....	.....	1.15	0 30	23
Do	.....	.....	.....	2.38	2 15	26
Minden	.....	7.57	25-26	.....	.....	.....
North Loup	.....	2.50	26	.....	.....	.....
Plattsmouth	.....	.....	.....	1.10	1 00	22
Ravenna	.....	4.00	25	4.00	3 40	25
Schuyler	.....	2.67	13	.....	.....	.....
Tekamah	11.76	2.62	6	.....	.....	.....
Do	.....	6.25	12-13	.....	.....	.....
New Jersey.						
New Brunswick	.....	.....	.....	2.26	1 00	20
Newton	.....	.....	.....	1.06	0 35	15
New York.						
Auburn	.....	.....	.....	1.75	0 15	15
Carmel	.....	2.91	28-29	1.26	1 00	24
Garrattsville	.....	.....	.....	1.30	0 50	13
Middletown	.....	3.20	28-29	.....	.....	.....
Port Jervis	.....	.....	.....	1.28	0 45	15
Rochester	.....	.....	.....	1.08	0 50	14
St. Johnsville	.....	3.93	20	3.94	2 00	20
North Carolina.						
Horse Cove	.....	3.76	11	1.45	0 45	11
Do	.....	.....	.....	1.03	1 00	25
Mana	.....	.....	.....	1.11	1 00	13
Marion	.....	2.89	27	.....	.....	.....
Raleigh	.....	.....	.....	1.67	1 00	9
Southern Pines	.....	3.46	10	.....	.....	.....
Wilmington	.....	.....	.....	1.33	1 00	21
North Dakota.						
Bismarck	.....	2.75	2-3	.....	.....	.....
Dunseith	.....	4.00	2-3	.....	.....	.....
Napoleon	.....	.....	.....	1.60	1 05	30
Towner	.....	3.46	3	.....	.....	.....
Willow City	.....	3.75	3	.....	.....	.....
Ohio.						
Bangorville	.....	3.19	19	.....	.....	.....
Levering	.....	3.55	20	.....	.....	.....
Mansfield	.....	4.10	19	.....	.....	.....
Pataskala	.....	5.58	20	5.58	4 00	20
Oklahoma.						
Beaver	.....	.....	.....	1.48	0 40	27
Hopeton	.....	2.50	15	.....	.....	.....
Pennsylvania.						
Beaver Dam	.....	.....	.....	2.06	1 50	28
Hawley	.....	2.80	24	.....	.....	.....
Hawthorn	.....	.....	.....	1.09	0 50	20
Lock Haven	.....	2.52	24-25	.....	.....	.....
Nisbet	.....	.....	.....	1.26	0 47	5
Selins Grove	.....	.....	.....	1.10	0 22	3
South Carolina.						
Blackville	.....	2.52	17	.....	.....	.....
Charleston	.....	.....	.....	1.01	1 00	21
Conway	.....	3.00	29-30	.....	.....	.....
Shaws Fork	.....	3.00	16	3.00	3 00	16
Statesburg	.....	2.85	16-17	.....	.....	.....
Summerville	.....	3.34	18	.....	.....	.....
Temperance	.....	2.60	10	2.60	3 00	10
Trenton	.....	.....	.....	1.41	1 20	28
Trial	.....	3.39	17-18	.....	.....	.....
South Dakota.						
Aberdeen	.....	3.50	1	.....	.....	.....
Centerville	.....	4.74	25-26	4.21	3 20	25
Hotch City	.....	.....	.....	2.00	1 00	10
Tennessee.						
Byrdstown	.....	.....	.....	1.70	1 20	25
Grace	.....	.....	.....	1.45	1 00	1
Memphis	.....	.....	.....	1.15	1 00	23
Springdale	.....	2.87	24-25	.....	.....	.....
Wildersville	.....	.....	.....	1.05	1 00	27
Texas.						
Alvin	.....	7.08	27-28	.....	.....	.....
Ballinger	.....	3.43	6	3.43	3 00	6
Brazoria	10.32	7.80	26-27	.....	.....	.....

TABLE X.—*Excessive precipitation*—Continued.

Stations.	Monthly rainfall 10 inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Texas—Continued.	*Inches.*	*Inches.*		*Ins.*	*h.m.*	
Brenham	22.01	19.99	27-30	.....	.....	.....
Camp Eagle Pass	13.50	3.00	6	.....	.....	.....
Do	.....	3.00	13	.....	.....	.....
Do	.....	2.50	16	.....	.....	.....
Childress	.....	2.54	4	.....	.....	.....
Do	.....	4.24	14-15	.....	.....	.....
Columbia	10.56	3.79	27-28	.....	.....	.....
Conroe	.....	3.88	28	.....	.....	.....
Corpus Christi	.....	2.55	17-18	.....	.....	.....
Corsicana	.....	2.80	29-30	.....	.....	.....
Cuero	18.82	3.09	15-16	.....	.....	.....
Do	.....	11.88	28-29	.....	.....	.....
Danevang	14.73	5.79	27-28	.....	.....	.....
Desdimonia	.....	3.20	6	.....	.....	.....
Emory	.....	2.53	28	.....	.....	.....
Estelle	.....	.....	.....	2.09	2 00	10
Fort Clark	22.32	18.00	14-15	18.00	21 30	14-15
Fredericksburg	10.30	4.10	5	.....	.....	.....
Do	.....	3.33	17	.....	.....	.....
Fruitland	.....	3.44	16	.....	.....	.....
Gainesville	.....	.....	.....	1.30	1 10	9
Galveston	.....	2.92	26-27	.....	.....	.....
Georgetown	.....	2.64	28	.....	.....	.....
Golindo	20.40	17.75	27-29	.....	.....	.....
Hallettsville	13.43	12.00	27-29	5.10	1 30	28
Hewett	19.25	3.25	16	.....	.....	.....
Do	.....	14.95	27-30	.....	.....	.....
Hondo	.....	7.35	6-7	.....	.....	.....
Houston	.....	2.50	29	.....	.....	.....
Huntsville	.....	5.80	29-30	.....	.....	.....
Junction	.....	4.95	7	.....	.....	.....
Kerrville	.....	2.61	7	.....	.....	.....
Lampasas	.....	3.45	28	.....	.....	.....
Mann	11.00	9.50	28-30	.....	.....	.....
New Braunfels	.....	2.95	13	.....	.....	.....
Palestine	.....	6.98	28-30	.....	.....	.....
Panter	11.06	3.75	28-29	.....	.....	.....
Rock Island	12.07	10.15	27-29	.....	.....	.....
Rocksprings	11.10	7.43	6-7	.....	.....	.....
Do	.....	3.30	14	.....	.....	.....
Sanderson	.....	.....	.....	1.05	1 00	6
Sugarland	12.68	10.50	27-29	.....	.....	.....
Temple	11.49	7.36	27-28	.....	.....	.....
Victoria	.....	3.02	27	.....	.....	.....
Waco	11.55	3.50	17	.....	.....	.....
Do	.....	4.20	28	.....	.....	.....
Do	.....	3.10	30	.....	.....	.....
Waxahachie	.....	5.15	29-30	.....	.....	.....
Weatherford	.....	2.85	29-30	.....	.....	.....
Vermont.						
Bennington	.....	3.50	15	.....	.....	.....
Vernon	.....	3.40	15	.....	.....	.....
Virginia.						
Blacksburg	.....	.....	.....	1.30	0 50	25
Charlottesville	.....	.....	.....	1.00	1 00	15
Farmville	.....	.....	.....	1.07	0 35	25
Norfolk	.....	.....	.....	1.08	0 32	1
Do	.....	.....	.....	1.18	0 25	9
Do	.....	.....	.....	1.01	1 00	10
West Virginia						
Fairmont	.....	.....	.....	1 26	1 15	20
Glenville	.....	.....	.....	1.96	1 30	14
Grafton	.....	.....	.....	1.50	1 30	21
Oceana	.....	2.80	24	.....	.....	.....
Upper Tract	.....	.....	.....	2.00	0 40	1
Wisconsin.						
Citypoint	11.37	.....	.....	.....	.....	.....
La Crosse	11.56	4.91	11-12	.....	.....	.....
Lancaster	.....	.....	.....	1.62	0 30	27
Milwaukee	.....	.....	.....	1.06	1 00	12
Prairie du Chien	.....	2.83	2	.....	.....	.....
Wyoming.						
Rocksprings	.....	3.50	12	.....	.....	.....
Porto Rico.						
Adjuntas	13.85	.....	.....	.....	.....	.....
Bayamon	15.59	2.67	14	.....	.....	.....
Luquillo	11.17	.....	.....	.....	.....	.....
San Juan	.....	.....	.....	1.02	0.55	16
West Indies.						
Cienfuegos, Cuba	.....	2.50	21	1.35	0 50	21
Do	.....	.....	.....	1.33	0 36	28
Port of Spain, Trinidad	.....	.....	.....	1.12	0 34	19

TABLE XI.—*Data furnished by the Canadian Meteorological Service, June*, 1899.

Stations.	Pressure.			Temperature.				Precipitation.		
	Mean not reduced.	Mean reduced.	Departure from normal.	Mean.	Departure from normal.	Mean maximum.	Mean minimum.	Total.	Departure from normal.	Depth of snow.
	Ins.	*Ins.*	*Ins.*	°	°	°	°	*Ins.*	*Ins.*	*Ins.*
St. Johns, N. F.	29.75	29.90	—.07	50.3	— 1.3	58.9	41.7	4.99	.....	
Sydney, C. B. I.	29.91	29.95	+.02	55.7	+ 0.3	65.7	45.7	3.44	—0.25	
Halifax, N. S.	29.87	29.97	+.03	56.0	— 1.7	66.9	49.0	3.89	— 0.01	
Grand Manan, N. B.	29.92	29.97	+.01	56.9	+ 0.7	65.4	48.5	1.88	—0.42	
Yarmouth, N. S.	29.91	29.99	+.06	55.5	+ 0.5	62.8	48.2	2.91	+0.77	
Charlottet'n, P. E. I.	29.89	29.93	—.01	59.0	+ 1.6	67.9	50.2	2.78	+0.03	
Chatham, N. B.	29.90	29.92	+.02	59.7	— 0.3	71.6	47.8	3.31	—0.98	
Father Point, Que.	29.88	29.91	+.05	52.1	— 0.9	61.2	43.0	4.59	+1.90	
Quebec, Que.	29.60	29.92	+.03	61.7	+ 0.5	72.3	51.0	3.81	+0.54	
Montreal, Que.	29.74	29.94	+.04	66.1	+ 1.2	74.8	57.4	2.46	—0.73	
Bissett, Ont.	29.39	29.99	+.09	61.6	+ 0.2	75.5	47.8	2.97	+0.22	
Ottawa, Ont.	29.64	29.95	.....	66.0	+ 0.7	76.5	55.5	2.37	.....	
Kingston, Ont.	29.69	30.00	+.06	62.5	— 0.9	70.9	54.1	1.57	—0.83	
Toronto, Ont.	29.65	30.02	+.06	66.0	+ 2.6	77.6	54.3	0.65	—2.07	
White River, Ont.	28.66	29.99	+.04	54.8	— 3.9	69 3	40.2	2.68	+0.71	
Port Stanley, Ont	29.41	30.04	+.09	65.0	+ 1.2	75.8	54.2	0.71	—2.31	

Stations.	Pressure.			Temperature.				Precipitation.		
	Mean not reduced.	Mean reduced.	Departure from normal.	Mean.	Departure from normal.	Mean maximum.	Mean minimum.	Total.	Departure from normal.	Depth of snow.
	Ins.	*Ins.*	*Ins.*	°	°	°	°	*Ins.*	*Ins.*	*Ins.*
Saugeen, Ont.	29.33	30.03	+.09	62.0	+ 1.6	72.7	51.3	1.93	—0.44	
Parry Sound, Ont.	29.32	30.00	+.07	61.5	— 0.2	72.0	51.0	4.44	+2.23	
Port Arthur, Ont.	29.24	29.93	+.02	55.9	— 0.5	66.9	45.0	3.84	+1.08	
Winnipeg, Man.	29.04	29.84	—.01	62.4	+ 0.2	74.2	50.6	3.68	—0.16	
Minnedosa, Man.	28.07	29.84	+.02	59.4	— 0.2	71.3	47.6	4.50	+0.71	
Qu'Appelle, Assin.	27.61	29.82	.00	57.1	— 2.8	67.7	46.5	4.68	+1.33	
Medicine Hat, Assin.	27.58	29.82	+.03	60.6	— 1.4	73.6	47.6	2.60	—0.43	
Swift Current, Assin.	27.33	29.86	+.04	57.9	— 2.1	69.5	46.2	3.17	—0.38	
Calgary, Alberta	26.34	29.81	—.04	53.2	— 2.8	66.5	39.9	3.52	+1.18	
Banff, Alberta	25.32	29.91	.....	49.5	.....	62.3	36.7	2.96	.....	0.9
Edmonton, Alberta	27.55	29.81	—.03	57.0	+ 0.1	70.1	43.9	2.93	+0.74	
Prince Albert, Sask.	28.26	29.77	.....	57.2	— 0.5	69.5	44.8	4.36	.....	
Battleford, Sask.	28.12	29.82	.....	58.3	— 1.2	70.1	46.5	3.41	.....	
Kamloops, B. C.	28.67	29.92	.....	62.2	.....	73.1	51.3	1.16	.....	
Esquimalt, B. C.	30.05	30.08	.....	55.3	— 1.2	64.2	46.4	0.68	.....	
Hamilton, Bermuda.	29.98	30.14	+.02	75.5	+ 0.5	80.8	70.1	4.84	.....	

Chart I. Tracks of Centers of High Areas — June, 1900.

Chart I. Tracks of Centers of High Areas. June, 1899.

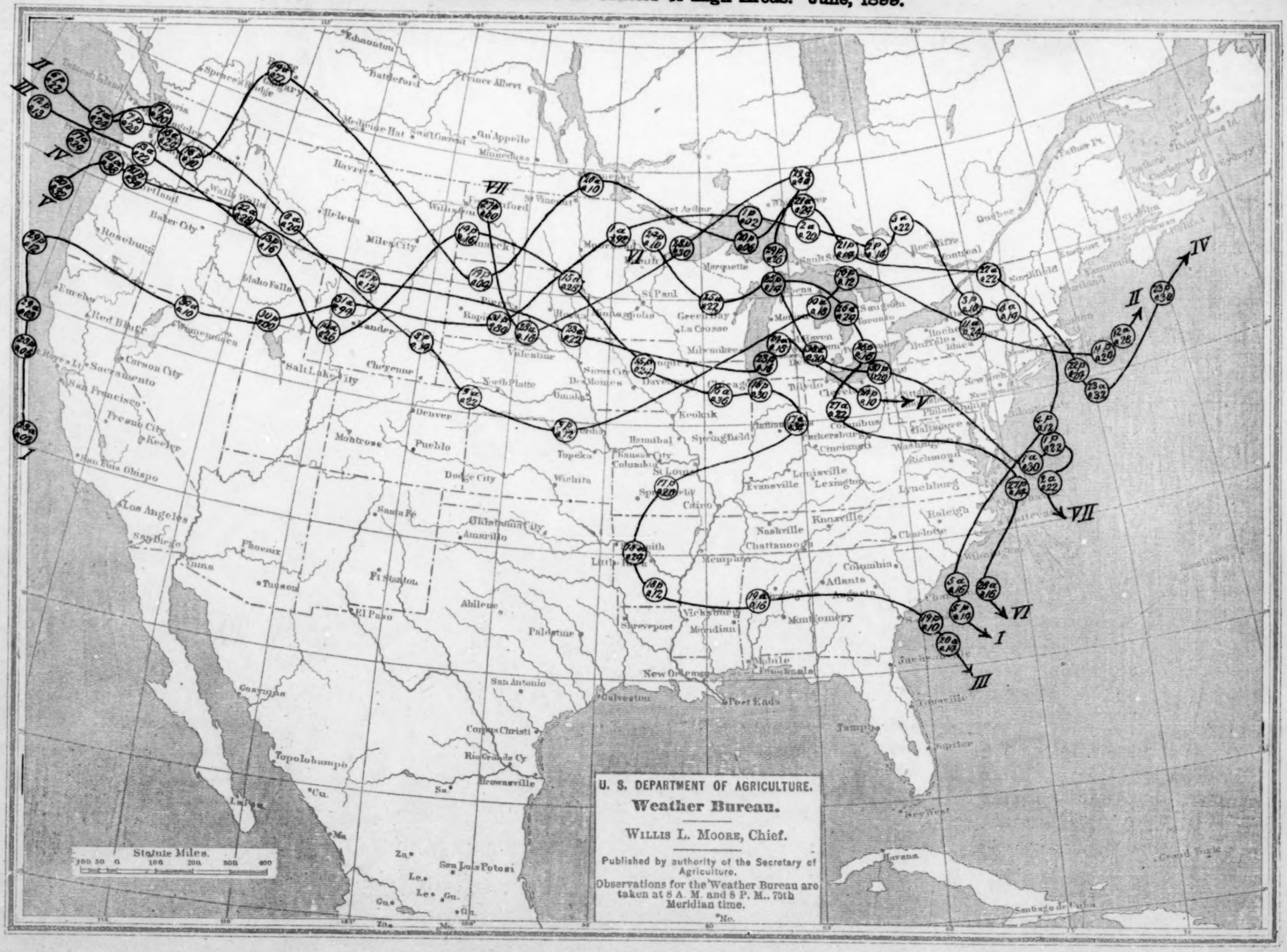

Chart II. Tracks of Centers of Low Areas. June, 1899.

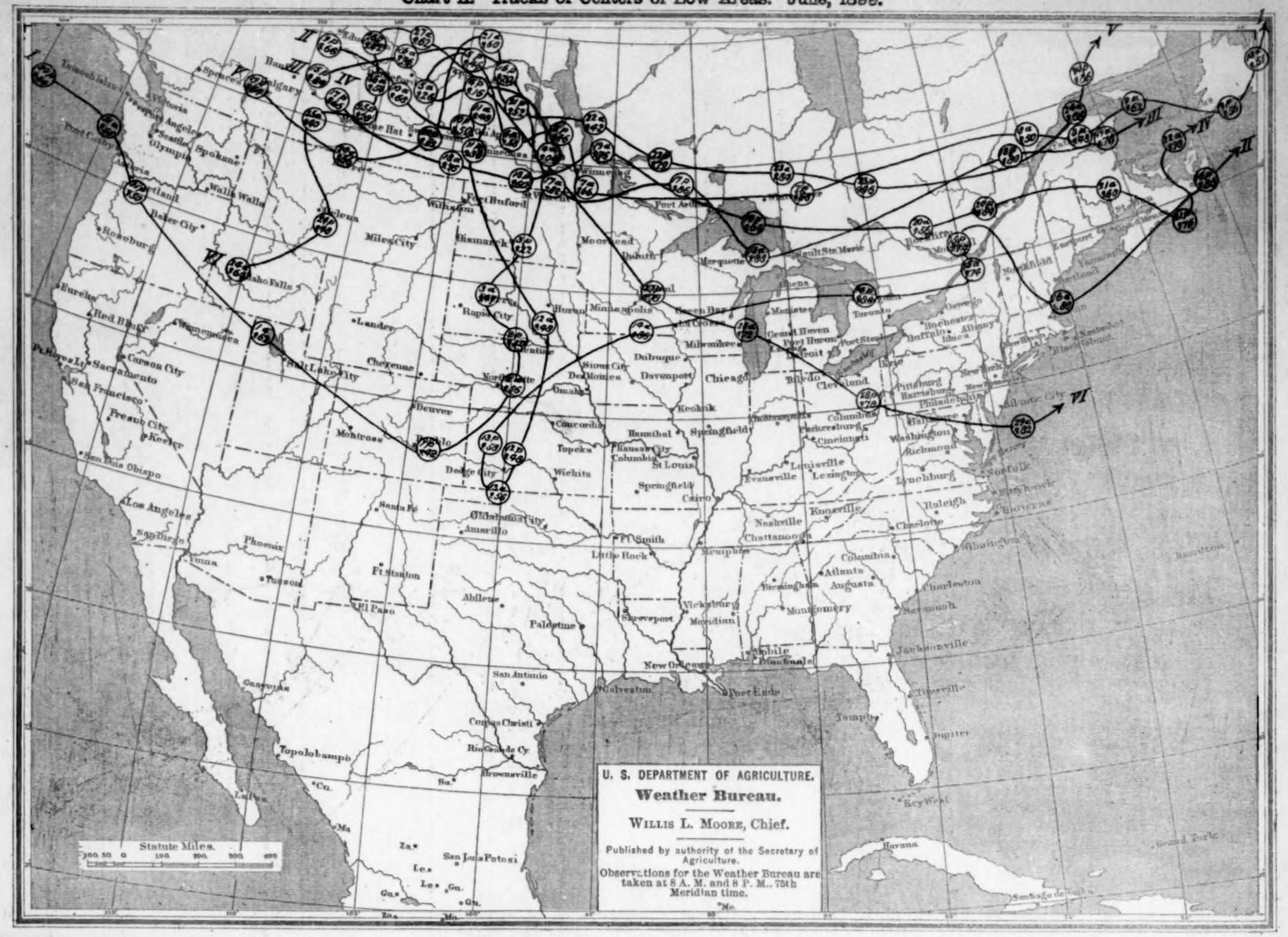
I
II
III
IV
V
VI
Statute Miles.
100 50 0 100 200 300 400
U. S. DEPARTMENT OF AGRICULTURE.
Weather Bureau.
WILLIS L. MOORE, Chief.
Published by authority of the Secretary of Agriculture.
Observations for the Weather Bureau are taken at 8 A. M. and 8 P. M., 75th Meridian time.

Chart III. Total Precipitation. June, 1899.

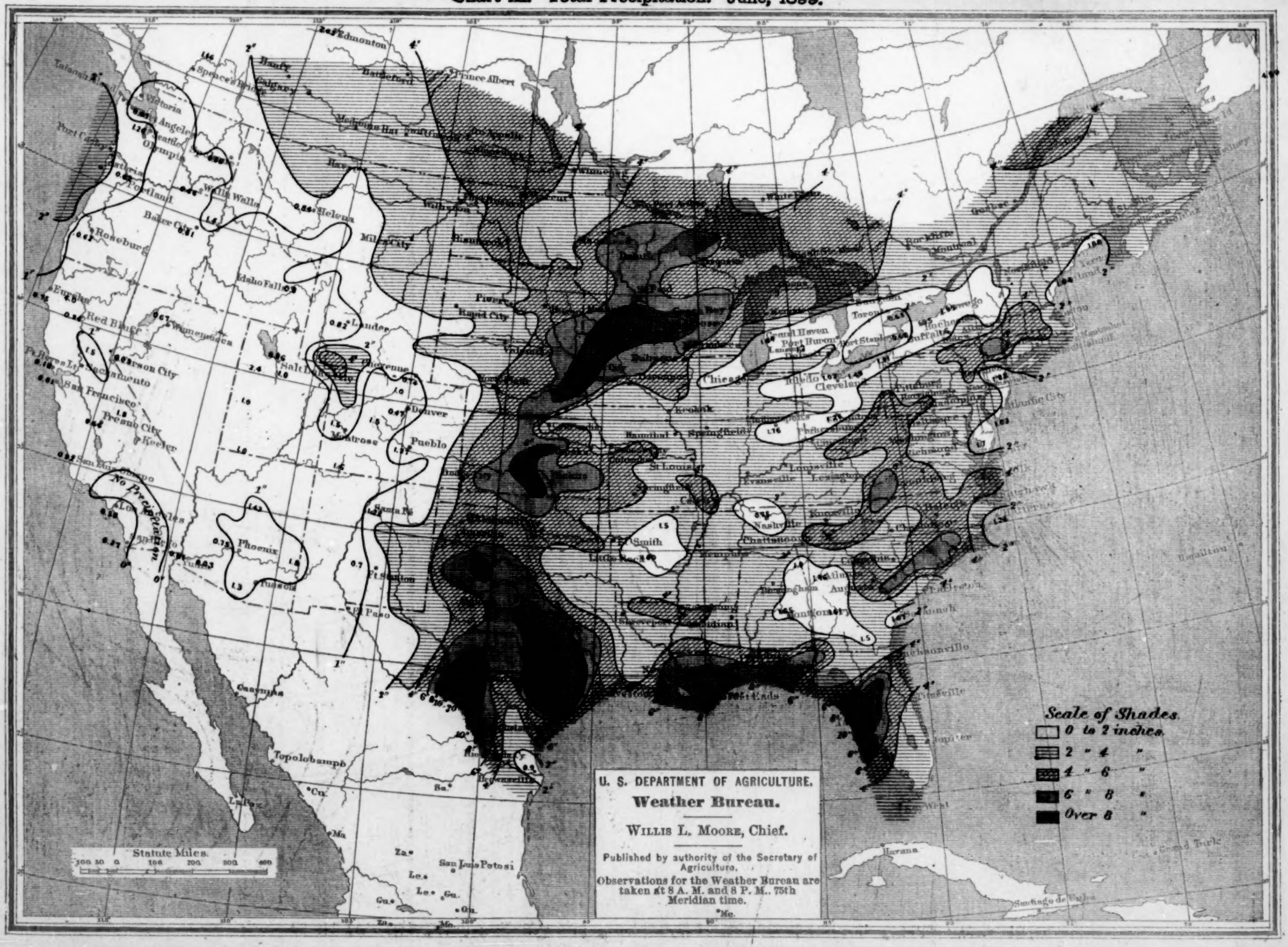

Chart IV. Sea-Level Pressure and Temperature; Resultant Surface Winds. June, 1899.

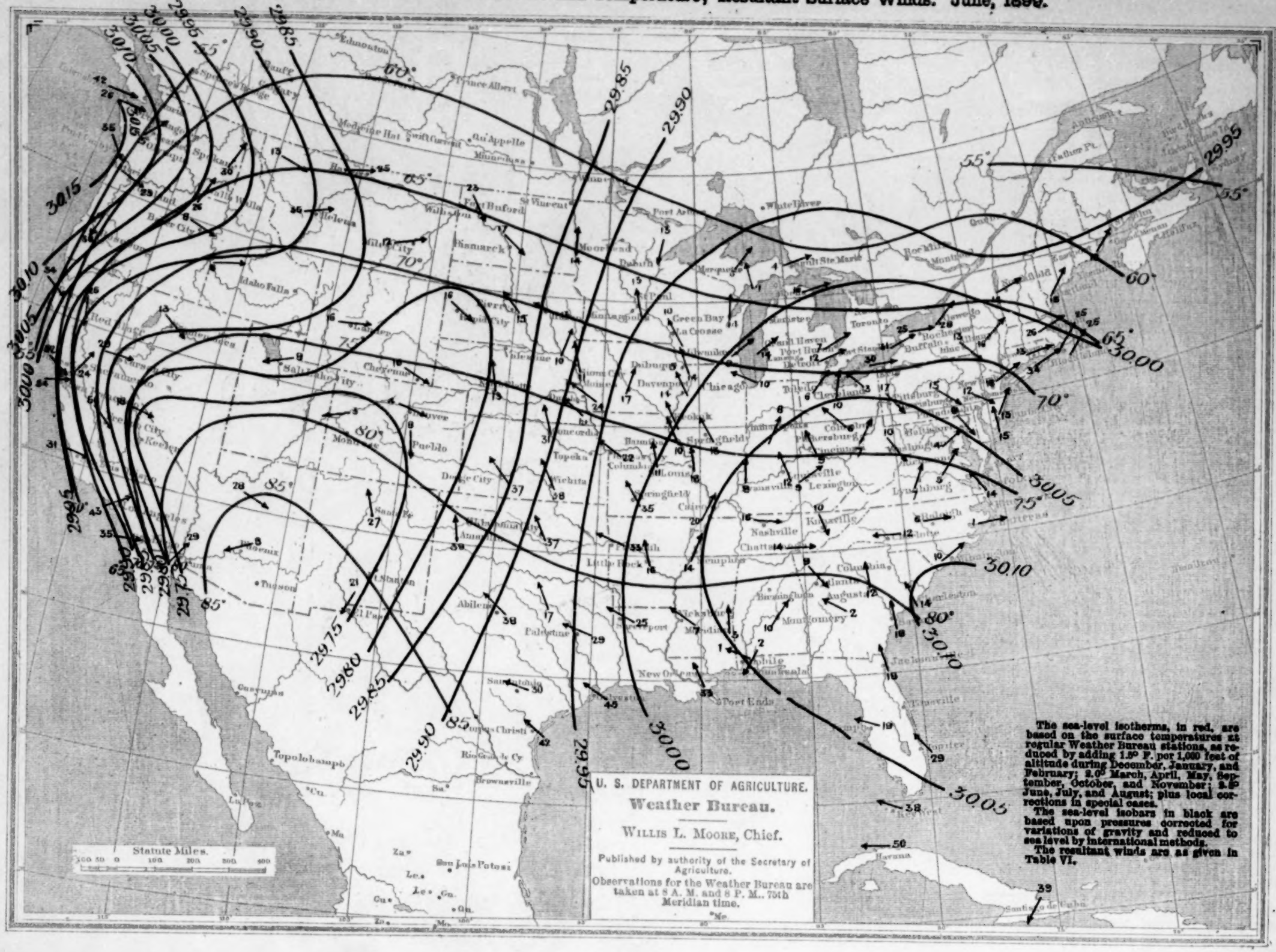
U. S. DEPARTMENT OF AGRICULTURE.
Weather Bureau.
WILLIS L. MOORE, Chief.
Published by authority of the Secretary of Agriculture.
Observations for the Weather Bureau are taken at 8 A. M. and 8 P. M., 75th Meridian time.
Statute Miles.
The sea-level isotherms, in red, are based on the surface temperatures at regular Weather Bureau stations, as reduced by adding 1.5° F. per 1,000 feet of altitude during December, January, and February; 2.0° March, April, May, September, October, and November; 2.5° June, July, and August; plus local corrections in special cases.
The sea-level isobars in black are based upon pressures corrected for variations of gravity and reduced to sea level by international methods.
The resultant winds are as given in Table VI.

Chart V. Hydrographs for Seven Principal Rivers of the United States. June, 1899.

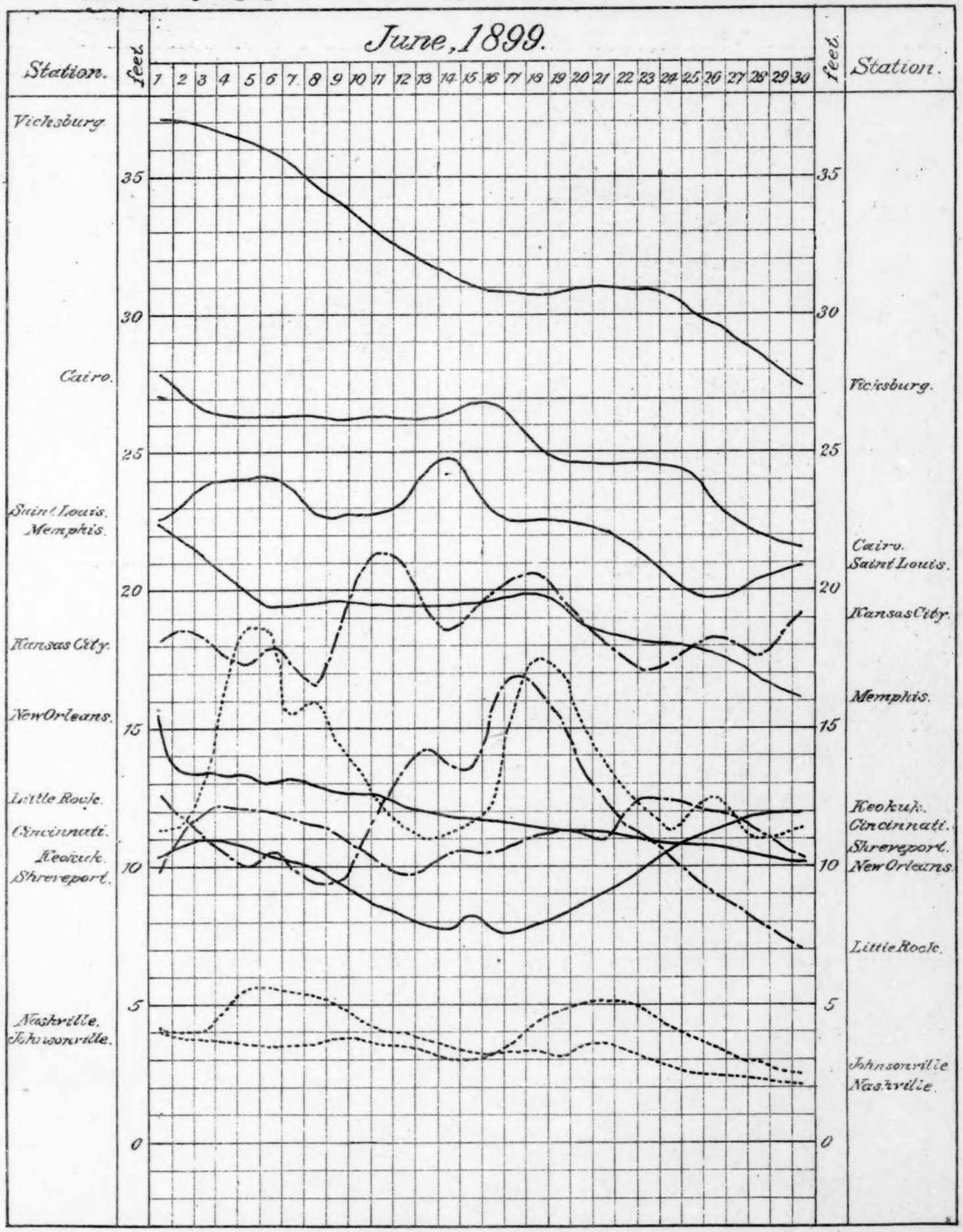

Chart VI. Surface Temperatures; Maximum, Minimum, and Mean. June, 1899.

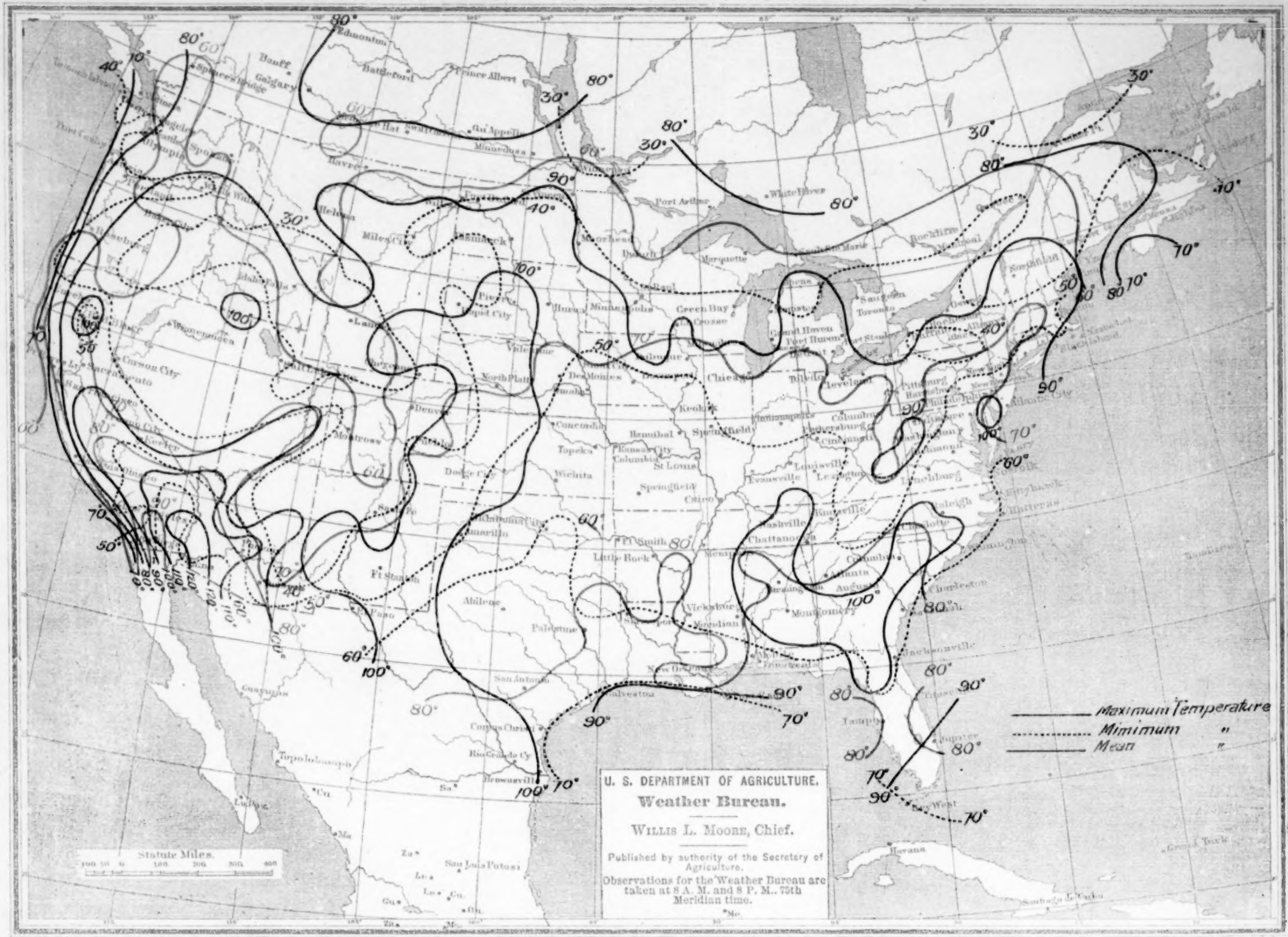
Maximum Temperature
Minimum "
Mean "
U. S. DEPARTMENT OF AGRICULTURE.
Weather Bureau.
WILLIS L. MOORE, Chief.
Published by authority of the Secretary of Agriculture.
Observations for the Weather Bureau are taken at 8 A. M. and 8 P. M., 75th Meridian time.
Statute Miles.

Chart VII. Percentage of Sunshine. June, 1899.

Chart VII. Percentage of Sunshine. June, 1899.

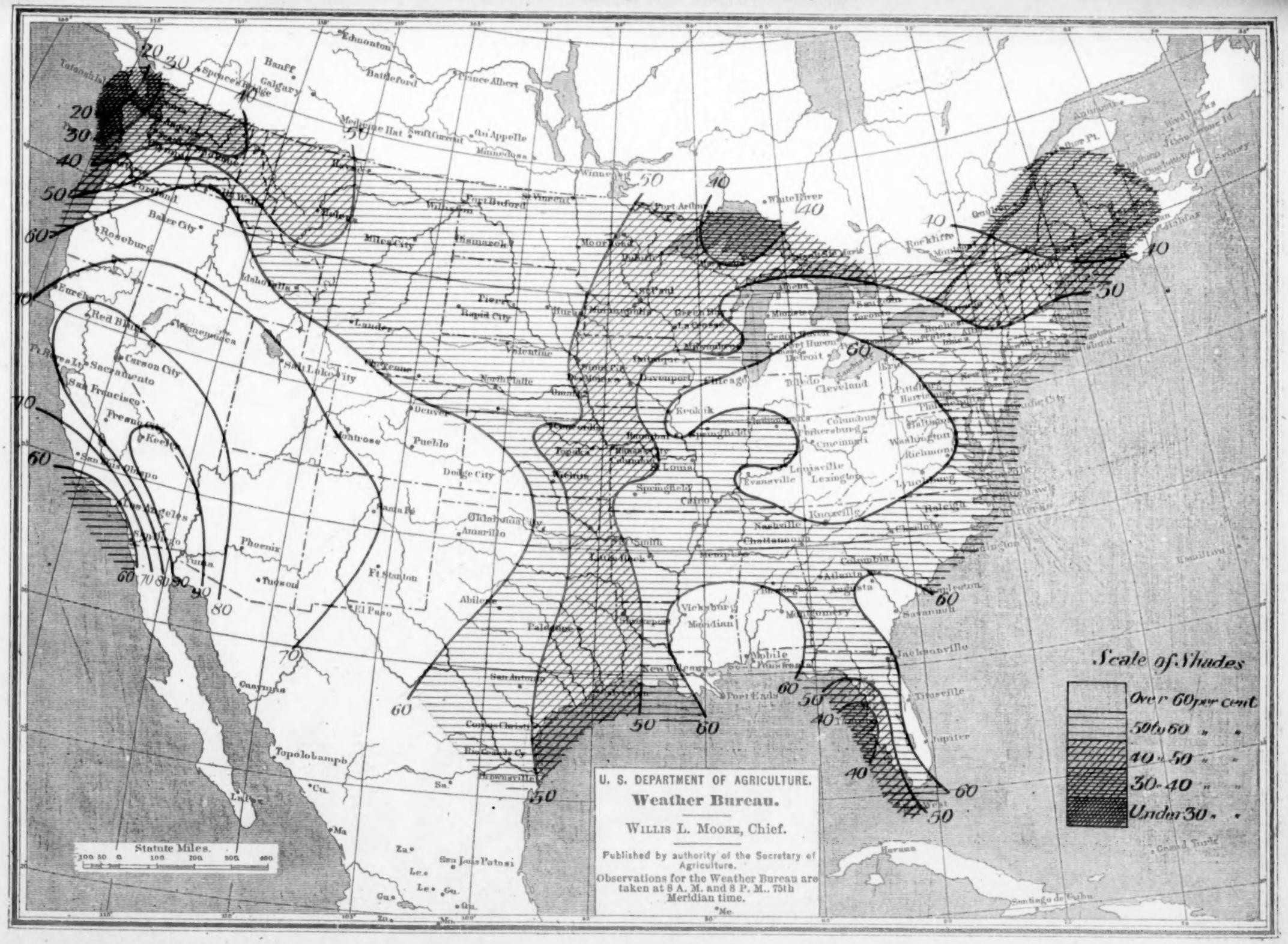
Scale of Shades
Over 60 per cent
50 to 60 " "
40 " 50 " "
30 " 40 " "
Under 30 " "
Statute Miles.
U. S. DEPARTMENT OF AGRICULTURE.
Weather Bureau.
WILLIS L. MOORE, Chief.
Published by authority of the Secretary of Agriculture.
Observations for the Weather Bureau are taken at 8 A. M. and 8 P. M., 75th Meridian time.

Chart VIII. West Indian Monthly Isobars, Isotherms, and Resultant Winds. May, 1899.

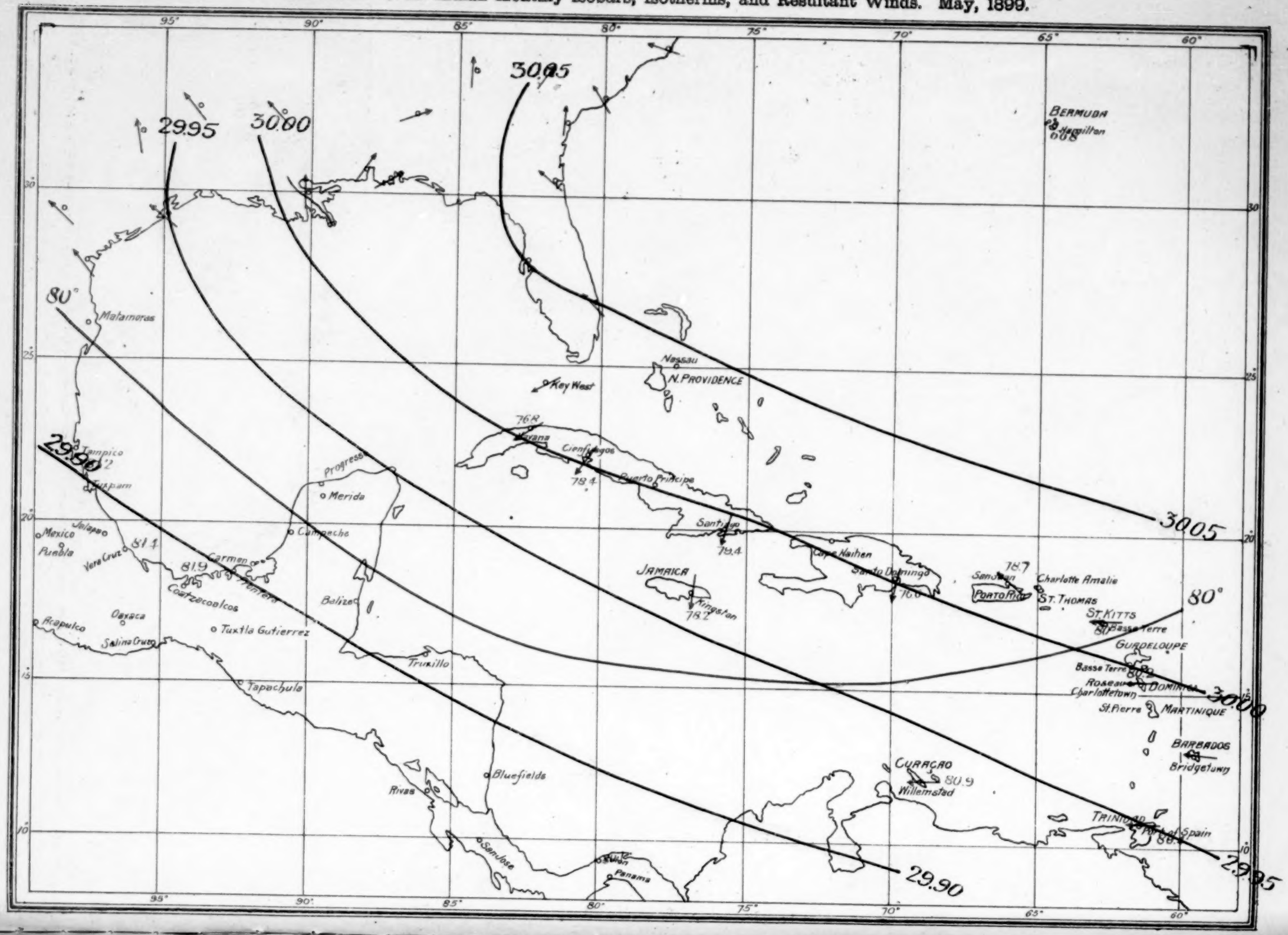

Chart IX. West Indian Monthly Isobars, Isotherms, and Resultant Winds. June, 1899.
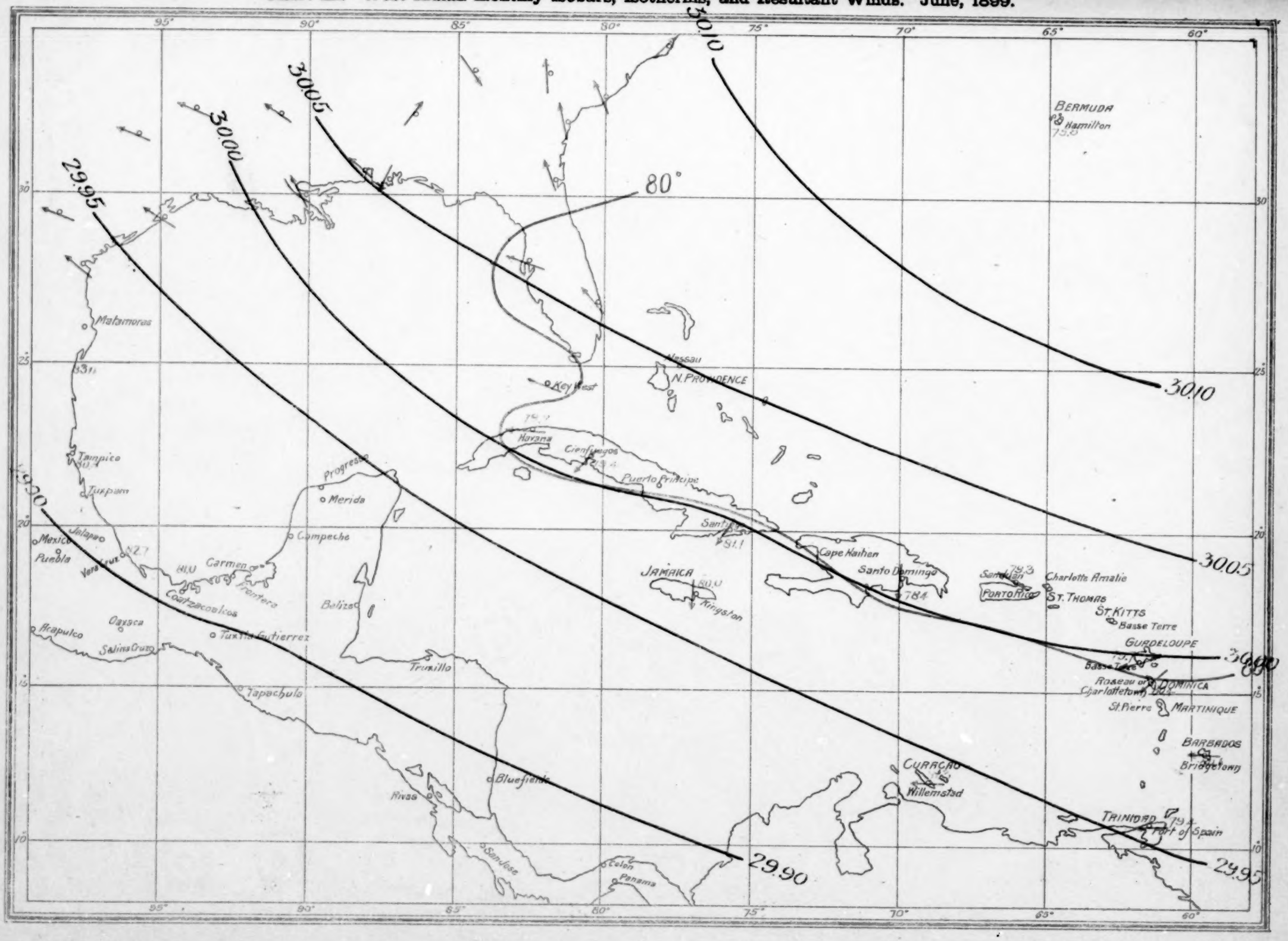
Chart IX. West Indian Monthly Isobars, Isotherms, and Resultant Winds. June, 1899.